Über dieses Buch

Dies ist ein digitales Exemplar eines Buches, das seit Generationen in den Regalen der Bibliotheken aufbewahrt wurde, bevor es von Google im Rahmen eines Projekts, mit dem die Bücher dieser Welt online verfügbar gemacht werden sollen, sorgfältig gescannt wurde.

Das Buch hat das Urheberrecht überdauert und kann nun öffentlich zugänglich gemacht werden. Ein öffentlich zugängliches Buch ist ein Buch, das niemals Urheberrechten unterlag oder bei dem die Schutzfrist des Urheberrechts abgelaufen ist. Ob ein Buch öffentlich zugänglich ist, kann von Land zu Land unterschiedlich sein. Öffentlich zugängliche Bücher sind unser Tor zur Vergangenheit und stellen ein geschichtliches, kulturelles und wissenschaftliches Vermögen dar, das häufig nur schwierig zu entdecken ist.

Gebrauchsspuren, Anmerkungen und andere Randbemerkungen, die im Originalband enthalten sind, finden sich auch in dieser Datei – eine Erinnerung an die lange Reise, die das Buch vom Verleger zu einer Bibliothek und weiter zu Ihnen hinter sich gebracht hat.

Nutzungsrichtlinien

Google ist stolz, mit Bibliotheken in partnerschaftlicher Zusammenarbeit öffentlich zugängliches Material zu digitalisieren und einer breiten Masse zugänglich zu machen. Öffentlich zugängliche Bücher gehören der Öffentlichkeit, und wir sind nur ihre Hüter. Nichtsdestotrotz ist diese Arbeit kostspielig. Um diese Ressource weiterhin zur Verfügung stellen zu können, haben wir Schritte unternommen, um den Missbrauch durch kommerzielle Parteien zu verhindern. Dazu gehören technische Einschränkungen für automatisierte Abfragen.

Wir bitten Sie um Einhaltung folgender Richtlinien:

+ *Nutzung der Dateien zu nichtkommerziellen Zwecken* Wir haben Google Buchsuche für Endanwender konzipiert und möchten, dass Sie diese Dateien nur für persönliche, nichtkommerzielle Zwecke verwenden.

+ *Keine automatisierten Abfragen* Senden Sie keine automatisierten Abfragen irgendwelcher Art an das Google-System. Wenn Sie Recherchen über maschinelle Übersetzung, optische Zeichenerkennung oder andere Bereiche durchführen, in denen der Zugang zu Text in großen Mengen nützlich ist, wenden Sie sich bitte an uns. Wir fördern die Nutzung des öffentlich zugänglichen Materials für diese Zwecke und können Ihnen unter Umständen helfen.

+ *Beibehaltung von Google-Markenelementen* Das "Wasserzeichen" von Google, das Sie in jeder Datei finden, ist wichtig zur Information über dieses Projekt und hilft den Anwendern weiteres Material über Google Buchsuche zu finden. Bitte entfernen Sie das Wasserzeichen nicht.

+ *Bewegen Sie sich innerhalb der Legalität* Unabhängig von Ihrem Verwendungszweck müssen Sie sich Ihrer Verantwortung bewusst sein, sicherzustellen, dass Ihre Nutzung legal ist. Gehen Sie nicht davon aus, dass ein Buch, das nach unserem Dafürhalten für Nutzer in den USA öffentlich zugänglich ist, auch für Nutzer in anderen Ländern öffentlich zugänglich ist. Ob ein Buch noch dem Urheberrecht unterliegt, ist von Land zu Land verschieden. Wir können keine Beratung leisten, ob eine bestimmte Nutzung eines bestimmten Buches gesetzlich zulässig ist. Gehen Sie nicht davon aus, dass das Erscheinen eines Buchs in Google Buchsuche bedeutet, dass es in jeder Form und überall auf der Welt verwendet werden kann. Eine Urheberrechtsverletzung kann schwerwiegende Folgen haben.

Über Google Buchsuche

Das Ziel von Google besteht darin, die weltweiten Informationen zu organisieren und allgemein nutzbar und zugänglich zu machen. Google Buchsuche hilft Lesern dabei, die Bücher dieser Welt zu entdecken, und unterstützt Autoren und Verleger dabei, neue Zielgruppen zu erreichen. Den gesamten Buchtext können Sie im Internet unter `http://books.google.com` durchsuchen.

This is a reproduction of a library book that was digitized by Google as part of an ongoing effort to preserve the information in books and make it universally accessible.

Google books

https://books.google.com

Digitized by Google

THE UNIVERSITY
OF ILLINOIS
LIBRARY
625.05
RLM
v.62
REMOTE STORAGE

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

THE

RAILWAY MAGAZINE.

VOL. LXII.

JANUARY TO JUNE,

1928.

LONDON:
33, TOTHILL STREET, WESTMINSTER, S.W.1.

Digitized by Google

INDEX TO VOL. LXII.

Articles.

PAGE.

Argentina-Bolivia International Rail Route, The .. .. *Ingram A. Barrett* and *H. R. Stones* 358
British Locomotive Practice and Performance .. .. *Cecil J. Allen* 17, 123, 209, 295, 375, 468
By Railway to the Roof of the World .. .. *Charles Travis* 442
Caprotti Valve Gear Applied to Locomotives, The 291
Employees, Railway, Census of 223
France, Heavy Electric Traction in .. .. *Theodore Rich* 185, 275
Goods Traffic on Steep Gradients, The Operation of .. .. *David L. Smith* 351
Great Western Railway Locomotive *King George V* in America 135
Great Western Railway, Modern Locomotive Practice on the .. .. .. *F. W. Brewer* 104, 194, 283, 388, 450
Locomotives, Total Weights and Maximum Axle Loads of the Largest in Great Britain 282
London & North Eastern Railway, From the Forth Bridge to Alloa and Stirling by the .. .. *J. Francis* 53
London & North Eastern Railway, Inaugural London-Edinburgh Non-Stop Runs 461
London & North Eastern Railway, London to Edinburgh Non-Stop 371
London & North Eastern Railway, Reinforced Concrete Sleepers on the 115
London & North Eastern Railway, The "Furthest North" Sections of the .. .. "*Indicator*" 33
London & North Eastern Railway, Three-Cylinder 4-4-0 Express Locomotives 15
London Midland & Scottish Railway, New 2-6-4 Tank Locomotives 208
London Midland & Scottish Railway, The Highland Section of the, in 1927 .. .. *G. E. Lane* 45
London Midland & Scottish Railway, The Peebles Branch of the .. .. *H. C. H. Moller* 29
London Midland & Scottish Railway, To Belfast via Heysham 445
London Midland & Scottish Railway, 400-Mile Non-Stop Runs by "The Royal Scot" Expresses 460
Matthew Murray and The Blenkinsop Locomotives .. .. *R. E. M. Bleasdale* 435
Mesopotamia, The Railways of .. .. *Richard Coke* 255
Milk Transport in Tank Wagons 120
Normandy, The Chemin de fer de l'Etat in .. .. *J. Macartney Robbins* 369
Notable Railway Stations and Their Traffic :—
Buchanan Street, Glasgow, L.M.S.R. .. .. *J. F. Gairns* 1
Victoria, Manchester, L.M.S.R. .. .. *J. F. Gairns* 87
Notable Railway Station in Buenos Aires, A : Retiro Terminus—Central Argentine Railway .. .. *H. R. Stones* 171
Oil Engines for Rail Cars and Locomotives 423
Queensland Government Railways, New 4-6-2 Locomotives 192
Railhead Distribution for Industrial Products 199
Southern Railway, Further Electrification on the 289, 339
Tattenham Corner by Electric Train, To 339
Train Despatching System, A Novel 117
"Underground," Ticket-Issuing Machines on the 221
West Cheshire, The Railways of .. .. *R. S. McNaught* 265
Westinghouse "Prestall" Vacuum Brake Cylinder 225

Locomotive Illustrations.

American 171, 358, 360, 362, 366
Australian 193, 467
Belgian 441
Diesel-Electric 423–434
Early 435–440
French 187, 275, 279, 281, 369, 370, 434
Garratt 323
Great Northern of Ireland 304, 469, 470
Great Southern of Ireland 134, 383, 468, 471, 472, 489
Great Western Railway 104, 107, 108, 111, 112, 132, 135, 136, 138, 194, 195, 196, 197, 198, 218, 283, 284, 286, 287, 288, 298, 354, 379, 388, 390, 392, 450, 452, 475, 487
Indian 154, 324, 325
Kitson-Still 2-6-2 Type Internal-Combustion Steam Locomotive 397
Ljungström Turbo-Condensing 129
London & North Eastern 14, 17, 20, 24, 26, 27, 28, 32, 36, 40, 41, 42, 43, 53, 123, 124, 125, 126, 127, 219, 297, 303, 352, 353, 371, 372, 375, 380, 381, 383, 386, 440, 461, 462, 463, 464, 465, 474
London Midland & Scottish 4, 18, 21, 22, 23, 29, 45, 48, 49, 50, 51, 52, 213, 215, 216, 217, 265, 268, 290, 295, 296, 351, 376, 377, 411, 460, 473
Mesopotamia 257, 260, 261, 262, 263
Model 116
New Zealand 274, 357, 405
Petrol 229
Sentinel 134, 148
Shropshire & Montgomeryshire Light 148
Southern 128, 160, 209, 220, 299, 305, 355, 476, 479

Locomotive Matters 83, 167, 251, 334, 497

Miscellaneous.

"Blue Train," Calais-Paris-Ventimiglia, passing Golfe Juan 440
Great Southern Railways, Ireland : Bray Station in Course of Reconstruction 86
Great Southern Railways, Ireland : Sentinel Locomotive No. 1 134
Kitson-Still 2-6-2 Type Internal-Combustion Steam Locomotive 397
Larbert, An Important Scottish Junction 13
"Locomotion," "Meccano" Model of 116
Locomotive Petrol, in Quarry Service 229

Digitized by Google

Miscellaneous—*continued.*

PAGE

L.M.S.R. Enamelled Steel Brake Vans .. 387
L.M.S.R., Interior of First-Class Compartment in New Corridor Coach .. 207
L.M.S.R. "Royal Scot" Class Locomotives .. 294
L.M.S.R. "Royal Scot" Poster .. 411
L.N.E.R. Sunday Excursion Train on "Waverley" Route .. 32
New Zealand, A Picture Puzzle from .. 274
New Zealand, Christmas Day, 1927, in .. 357
Southern Railway Carriage fitted with Templates .. 454
Two Little-Known Continental Locomotives .. 441

Pertinent Paragraphs

.. 69, 143, 235, 317, 401, 485

Plates.

G.W.R. Sunday Down Cornish Riviera Express .. *facing* 339
L.M.S.R. Diesel-Electric Train (colour) .. 423
L.M.S.R. Down "Royal Scot" Express (colour) .. ,, 1
L.M.S.R. New 2-6-4 Passenger Tank Engine .. ,, 171
L.N.E.R., G.C. Section Manchester-London Restaurant Car Express .. , 255
Southern Railway, Up "Southern Belle" Express .. ,, 87

Railway Literature

.. 66, 170, 312, 421, 505

Railway Portrait Gallery.

Mr. H. Allaway, Assistant General Manager (Shipping), L.N.E.R. .. 156
Mr. T. E. Argile, Goods Manager, Northern Division, Glasgow, L.M.S.R. .. 158
Mr. R. Brown, Assistant to Chief Accountant, L.N.E.R. .. 328
Mr. H. Stewart Coe, Secretary, Great Southern Railways, Ireland .. 491
Mr. C. G. G. Dandridge, Advertising Manager, L.N.E.R. .. 156
Mr. E. H. Davies, Goods Operating Manager, Euston, L.M.S.R. .. 158
Mr. P. Defrance, London Representative, Belgian State and National Railways, 1894-1927 .. 77
Mr. K. W. Doughty, Accountant, Cheshire Lines Committee .. 244
Mr. F. G. Evans, C.B.E., Secretary, L.M.S.R. .. 75
Mr. T. Elliott, Commercial Manager, Great Southern Railways, Ireland .. 412
Mr. P. J. Floyd, Traffic Manager, Great Southern Railways, Ireland .. 243
Mr. S. A. V. Gregory, District Passenger Manager, London, L.N.E.R. .. 328
Mr. J. A. Jenkinson, District Superintendent, Manchester, L.N.E.R. .. 244
Mr. A. S. Matthews, Assistant Secretary, Central Argentine Railway .. 327
M. A. Mertz, London Representative, Belgian National Railways .. 77
Mr. G. Mills, Assistant to Chief General Manager (Rates and Statistics), L.N.E.R. .. 158
Mr. H. E. Morgan, Signals Assistant to Divisional Engineer, Crewe, L.M.S.R .. 492
Sir John Nicholson, C.M.G., Chief Engineer for Docks, L.N.E.R., 1923-27 .. 156
Mr. A. Oldham, Signals Assistant to Divisional Engineer, Derby, L.M.S.R. .. 492
Mr. E. G. Oliver, Chief Outdoor Assistant, Derby, Carriage and Wagon Department, L.M.S.R. .. 413
Mr. Frank Pick, Managing Director, Associated "Underground" Companies .. 307
Mr. J. Purves, Divisional Carriage and Wagon Superintendent, Wolverton, L.M.S.R. .. 413
Mr. W. A. Ree, Chief Stores Superintendent, L.M.S.R. .. 76
Mr. C. E. Riley, General Manager, Great Southern Railways, Ireland .. 368
Mr. V. A. M. Robertson, Civil Engineer, "Underground" Railways .. 492
Mr. A. E. Sewell, Assistant Goods Manager, Southern Area, L.N.E.R. .. 244
Mr. G. Sutcliffe, Stationmaster, King's Cross, L.N.E.R. .. 244
Mr. G. Sutherland, Divisional Accountant, Southern Area, L.N.E.R. .. 328
Mr. W. M. Teasdale, Assistant General Manager (Parliamentary) and Industrial Agent, L.N.E.R. .. 155
Mr. J. C. L. Train, Assistant to Chief General Manager (Works), L.N.E.R. .. 158
Mr. F. Treasure, Stationmaster, Baker Street, Metropolitan Railway .. 76
Mr. J. A. Wickham, C.B.E., Chief Engineer for Docks, L.N.E.R. .. 156
Mr. W. F. Yates, Divisional Solicitor, Manchester, L.M.S.R. .. 492

The Why and the Wherefore

.. 60, 139, 230, 308, 398, 481

What the Railways are Doing

.. 75, 155, 243, 327, 412, 491

713677

Digitized by Google

LONDON:
HARRISON AND SONS, LTD., PRINTERS IN ORDINARY TO HIS MAJESTY,
44-47, ST. MARTIN'S LANE, W.C. 2.

Digitized by Google

Digitized by Google

THE RAILWAY MAGAZINE.

DOWN "ROYAL SCOT" EXPRESS, L.M.S.R.,

PASSING LEIGHTON BUZZARD, NON-STOP TO CARLISLE.

From a photograph by "The Times," painted by F. Moore.

Digitized by Google

GENERAL VIEW OF PASSENGER STATION.

Notable Railway Stations and their Traffic.

BUCHANAN STREET, GLASGOW, L.M.S.R.

By J. F. GAIRNS, M.I.Loco.E., M.Inst.T.

Buchanan Street Passenger Station.

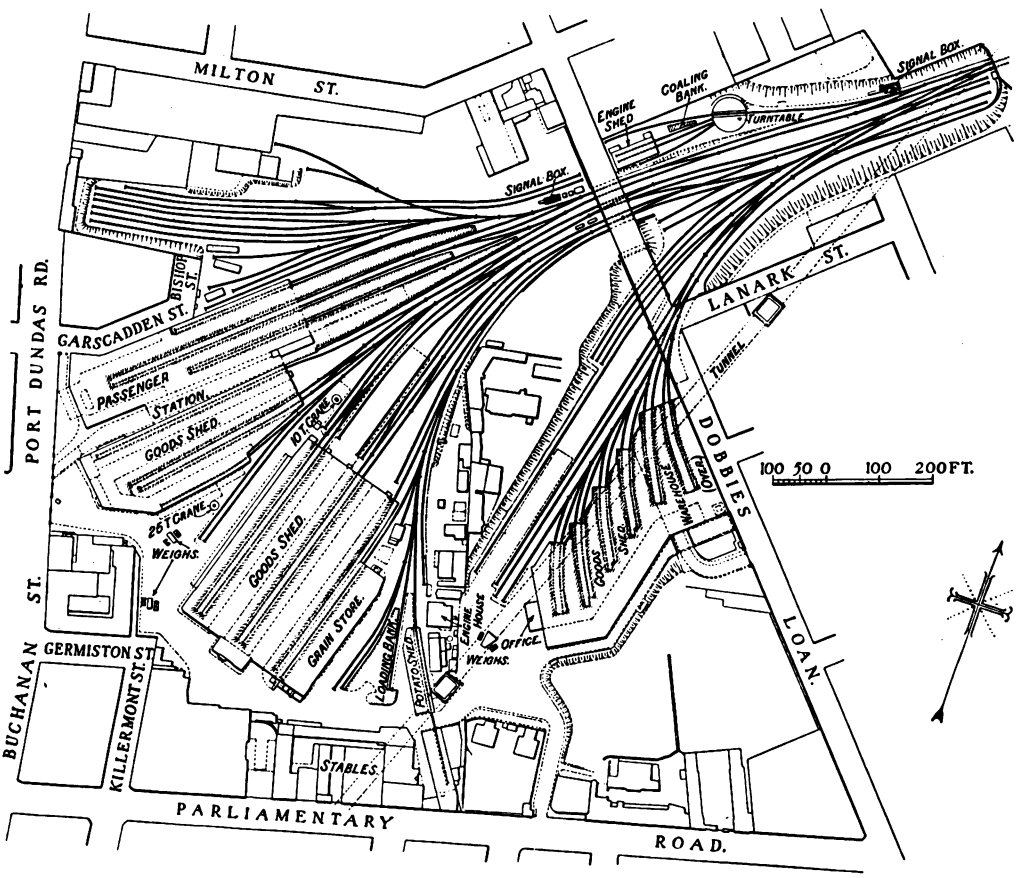
UNLIKE most of the stations which have received attention in these articles, Buchanan Street passenger station, Glasgow, has no claims to architectural noteworthiness; it is not particularly large, having but five platforms; the number of trains dealt with does not reach a large total; and the opinion is sometimes expressed that it needs reconstruction before it can be described as convenient for the operation of traffic or suitably equipped for the reception of the considerable numbers of passengers who use it. Further, it is located in a somewhat "drab" part of Glasgow, surrounded by mean streets and tenement buildings, on the borders of the industrial area, while the fact that alongside it is the huge goods depot of the same name tends to detract from, rather than to add to, its "notability" in the sense in which that term is generally employed—to suggest interesting buildings, up-to-date design, lay-out and equipment, and magnitude and variety of traffic.

Yet, admitting all this, Buchanan Street passenger station is an important one to the L.M.S.R., in that it deals with practically all the by-no-means inconsiderable traffic of the Glasgow-Perth-Aberdeen and Dundee route, together with that of the Oban and Inverness lines; its trains serve quite a number of intermediate junctions with lines which possess substantial traffic interest; nearly all its trains include Pullman restaurant-car facilities and are made up of modern stock; it is not really so far removed from the central districts of Glasgow as many people imagine, in that the other end of Buchanan Street is quite close to St. Enoch and in its course it passes near to the relatively aristocratic Central station; it serves a route which includes Glasgow's first railway, and is historically important; and the adjoining goods station ranks as the largest and busiest in

Digitized by Google

Scotland. Indeed, whether readers agree that Buchanan Street passenger station can correctly be described as "notable" or not, there can be no question that that term is justifiably applied to the goods depot, while the fact that they are so closely associated calls for their consideration together.

It will be recalled that Glasgow's first railway was the Glasgow, Garnkirk and Coatbridge. This was opened in 1831, commencing at a point near the present St. Rollox station (about half a mile from Buchanan Street), and connected with the Monkland and Kirkintilloch (opened 1826) at Cumbernauld. In due course, connections were made by the Wishaw and Coltness with the Caledonian Railway as it was constructed from Carlisle to Carstairs and thence to Garriongill Junction, while the Scottish Central Railway, with its extensions and connections, provided for train services in the Stirling and Perth direction, so that it was to St. Rollox (in 1848) and to Buchanan Street (in 1849) that Caledonian trains ran from England when the West Coast route was completed. The English traffic, indeed, continued to use Buchanan Street for 30 years, in that it was not until 1879 that the better-known Central station became available therefor (Greenock and coast-line traffic was handled at Bridge Street, near the present Eglinton Street station). Buchanan Street was, therefore, the principal Caledonian station in Glasgow for quite a long period, which explains why its headquarters' offices were located there. These offices adjoin the goods depot, and certain



PLAN OF BUCHANAN STREET PASSENGER AND GOODS STATIONS.

Digitized by Google

departments still use them, though, since the formation of the L.M.S.R., others are accommodated at Central and St. Enoch stations. Since 1879, however, Buchanan Street passenger station has dealt only with traffic between Glasgow and Stirling, Perth, Dundee, Aberdeen, Inverness and Oban (except for a few local services, those to Hamilton being the only ones involving a diverging route), all other Caledonian routes being served by Central station, while the through services between England and Stirling and beyond are generally conducted separately, using lines between Law Junction or Wishaw and Greenhill, which enable them to avoid central Glasgow altogether.

Buchanan Street station is located at the northern end of the thoroughfare of that name, at the junction of Buchanan Street, Port Dundas Road, West Nile Street and Cowcaddens Street. Approached *via* Buchanan Street, the old chief offices are first encountered; beyond and behind them is the goods depot, and directly adjoining, along Port Dundas Road, is the passenger station. Between it and the goods depot is a wide cab road leading to a covered cab yard on the up arrival side. This approach also leads to a covered yard for cabs bringing passengers, the yard being railed off from the public road and having an exit at the junction of Cowcaddens Street with Port Dundas Road.

From this courtyard access is had through two doorways to the booking hall, where there are seven booking windows, classified for the issue of tickets as usual in Scotland. To the left, partially along the arrival side of the station, may be noted telegraph office, shop parcels section, outwards parcels and left luggage offices, and lavatories, while a little further along is the inwards parcels office. These all have outside access to the arrival cab road, so that parcels traffic can be loaded or unloaded direct to or from vans under cover.

Behind the booking offices are the bookstall, tobacco, confectionery and fruit stalls, and in the corner, adjacent to the departure platforms, refreshment and tea rooms. Beyond, following No. 2 platform, are the stationmaster's office, ladies' waiting room, fruit stall, bookstall, with staff offices, one for the supply of pillows and rugs to night passengers, other waiting rooms, lavatories, &c.

Of the five platforms, two only extend right up to the circulating area, these being Nos. 2 and 3, behind the buffer stops of which is a big train indicator. No. 1 extends for about two-thirds only of the length of No. 2, and commences beyond the point where the station offices along No. 2 terminate. No. 4 is double-sided, commencing near the inwards parcels office on the arrival side, while No. 5 is merely an open platform, generally allocated for milk traffic, though at busy times it is also used for passenger traffic. The respective lengths of the platforms are:—No. 1, 571 ft.; No. 2, 702 ft.; No. 3, 655 ft.; No. 4, 530 ft. and 651 ft.; and No. 5, 405 ft.

The roofing is of old-fashioned type—the station, as a whole, merits this description in many respects, as indicated by the extent to which timber enters into its construction—and is of longitudinal gable design, with three rows of supporting pillars, the main gables having smoke vents over the principal lines. Beyond this roof ordinary platform shelters are provided along the platforms between Nos. 1 and 2 and Nos. 3 and 4, the outer ends of these platforms and the whole of No. 5 being uncovered.

On the departure side there are eleven carriage sidings, but several of these are short, owing to the need for fitting them into a somewhat restricted and awkwardly-located area. All traffic within station limits is controlled by the station signal box, though shunting movements, which are numerous, often involve also the services of the Tunnel box, about a quarter of a mile beyond. By that time, however, connections are made with the goods depot lines, in that all tracks, for both passenger and goods stations, have to merge into two through the tunnel between Buchanan Street and St. Rollox stations. The station box, which has just received a new frame, has 98 levers and the tunnel box 53.

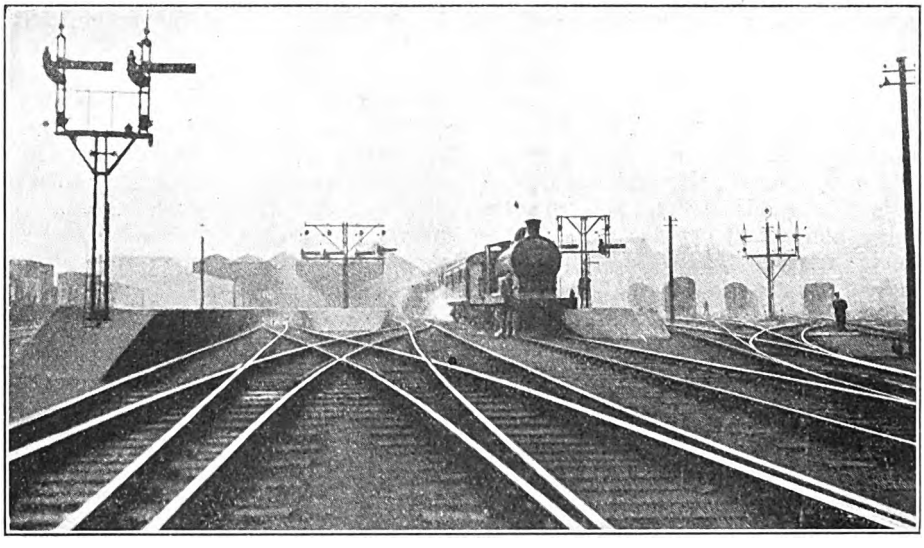
Signalling is the ordinary manual, and involves several interesting signal structures. Owing to the number of movements requiring use of both the up and down lines, each platform has two starting signals, respectively to the down and the up lines, and some of these are

Digitized by Google

suspended from the supporting framework instead of upon it as usual, a feature which will be seen from the photographs reproduced. This arrangement is adopted for constructional convenience or to meet sighting requirements. Just beyond the station is Dobbies' Loan Bridge, and on the further side of this are two signal groups. One includes the down starting signal and four up signals covering movements from the down line to platforms Nos. 1, 2, 3 and 4. There are also two smaller arms governing movements into the carriage sidings. The other combination, of three arms, allows up trains to enter platforms Nos. 3, 4 and 5.

thus involved by considering the trains in order, on the basis of the summer arrangements.

In the down direction (omitting the Hamilton trains), the day's work commences with the 5.50 a.m. stopping train to Perth. At 7.15 a.m. a Pullman car express leaves with a section for Dundee as well as for Aberdeen. At 8 a.m. a popular train leaves for Larbert, Stirling, Dunblane and the Oban line. This is followed by a stopping train at 8.5 a.m. to Perth. At 8.45 a.m. an express leaves for Larbert and Stirling, where it is combined with a section from Edinburgh, and continues to Gleneagles, Crieff and Balqu-



GENERAL VIEW FROM OUTER END OF PASSENGER STATION.

It will thus be seen that the passenger station is necessarily operated mainly on the basis of arrival and departure traffic, but this is not a serious factor as the large majority of the trains are of a main-line character, so that movements before departure and after arrival are chiefly of a shunting character, while the signalling is relatively complete, so far as signal control of shunting movements is concerned.

Except for about a dozen trains daily each way to and from Hamilton, or a portion of the route, practically all trains dealt with at Buchanan Street follow the Stirling and Perth route, though some do not go all the way, and it will be best to indicate the principal characteristics of the traffic

hidder. At 9.15 a.m. an express leaves for Perth and Dundee, and at 9.45 a.m. the Oban section of the 10 o'clock group leaves for Oban. The 10 a.m. proper is one of the principal Aberdeen services, making its first stop at Gleneagles, while the following Inverness train at 10.10 a.m. calls at Stirling instead, on the way to Perth. The 10.25 a.m. is a stopping train to Larbert and Alloa, with a section detached at Lower Greenhill for Denny.

Then comes the 12 o'clock group, consisting of the 12 noon express for Aberdeen and the 12.10 p.m. for Oban. These are followed by the 12.15 p.m. stopping train to Perth, the 12.45 p.m. Saturday train to Cumbernauld, and the 12.55 p.m., not

Digitized by Google

Saturdays, to Glenboig. The latter train, by the way, is largely used by passengers returning home for the midday meal, as is so usual in the large Scottish cities.

At 1.5 p.m. there is, on Saturday, a Gleneagles, Crieff and Balquhidder and Callander express, divided at Dunblane, and at 1.30 p.m. there is another Aberdeen express, followed at 1.40 p.m. by a combined Dundee and Inverness express, with a further section detached at Stirling for Dunblane and the Oban line. At 1.47 p.m. a Saturday train leaves for Stirling. The 2.30 p.m. to Cumbernauld is replaced on Saturdays by the 2.50 p.m. to Glenboig, and at 4 p.m. there is a semi-fast train for Gleneagles and Crieff and for Callander, divided at Stirling.

At 4.30 p.m. there is a local to Glenboig, in front of the 5 o'clock group of trains, consisting of the 5 p.m. for Aberdeen and Dundee, the 5.20 p.m. for Oban, and the 5.30 p.m. which divides at Lower Greenhill to serve Stirling and Dunblane and Denny. The 6.5 p.m. is still another Aberdeen and Dundee express, while the 6.15 p.m. is a local to Cumbernauld. At 8 p.m. a stopping train leaves for Stirling and Gleneagles, and at 9.5 p.m. there is another local for Glenboig.

At 10 p.m. the night mail leaves, this including sections for Aberdeen and Inverness (with sleeping car), and mail and parcels vans. It is combined with the Edinburgh section at Dunblane. Except on Saturdays, the day is completed by the 10.40 p.m. local to Glenboig, but on Wednesdays and Saturdays this train is preceded by the 10.35 p.m. semi-fast for Larbert and Stirling.

In view of the fact that the long-distance trains mentioned give services to all principal stations and junctions on the respective routes by connections, if not by one of the trains in each group, the result is really a generous service of inter-city facilities, and it is mainly the fact that these are all on related routes, and that there is no call for extensive local and suburban services that prevents Buchanan Street from ranking among the busy terminal stations as well as the important ones. Moreover, all the chief trains in the group, except the 10 p.m., have Pullman restaurant-car facilities to Aberdeen and sometimes to Dundee, Oban and Inverness also, while they are often quite heavy trains, calling for double-heading, and are all made up of modern corridor bogie stock.

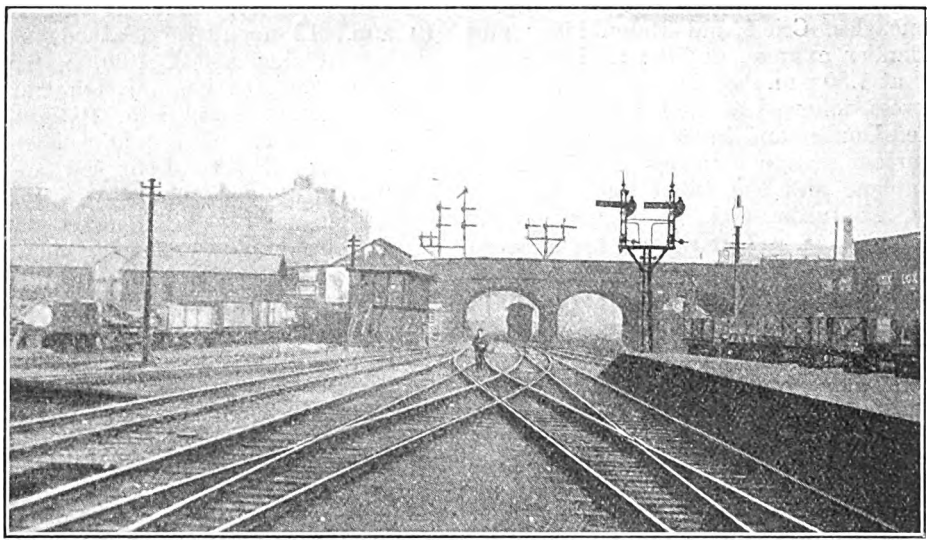
Analysing the service, we find that there are trains for Aberdeen at 7.15, 9.15 (Saturdays only, changing at Perth), 10 a.m., 12 noon, 1.5 (Saturdays only, change at Gleneagles), 1.30, 5, 6.5 and 10 p.m. Dundee has through trains or connections at 7.15, 9.15, 10 a.m., 12, 1.40, 4, 5 and 6.5 p.m. There are through services to Inverness at 7.15, 10.10 a.m., 1.40 and 10 p.m., with Pullman restaurant cars for part, if not the whole, of the journey, and a sleeping car on the night train, while Oban has the 8 a.m., 9.45 a.m., (first-class Pullman observation car, Glasgow to Oban), 12.10, 5.10 (Pullman restaurant car, Glasgow to Oban), and 10 p.m., with several other services to Callander and those *via* Gleneagles and Crieff to Balquhidder.

In the opposite direction the characteristics generally correspond, so that the trains can be reviewed in list form, on the basis of the arrivals scheduled in the summer services.

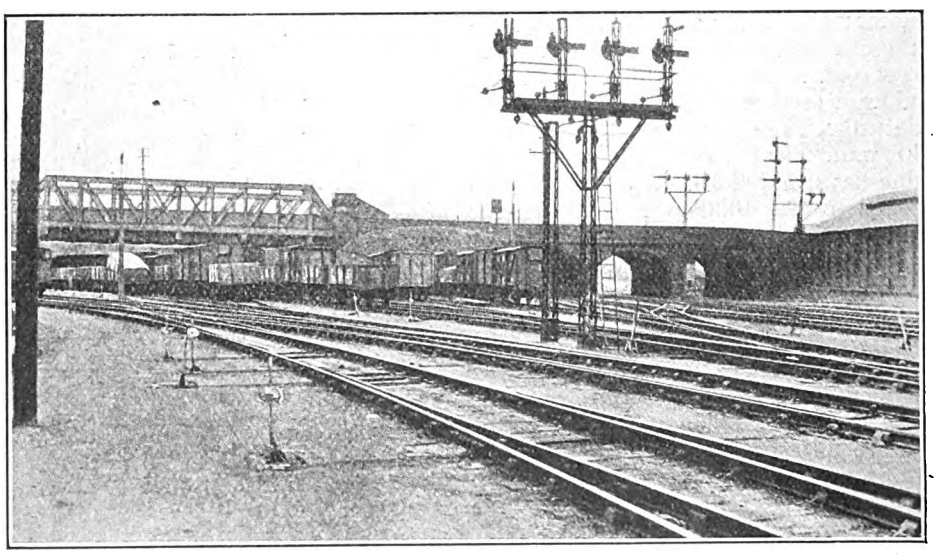
a.m.	
8.33	Stopping train from Perth.
8.56	Semi-fast from Perth.
9.18	Residential express from Callander.
9.38	Semi-fast from Alloa.
9.50	Residential express from Crieff and Gleneagles.
10.30	Express from Dundee.
10.55	Express from Stirling (portion of express from Aberdeen).
p.m.	
12.36	Stopping train from Dundee.
12.45	Express from Dundee.
1.35	Express from Oban.
1.50	Express from Dundee.
2.16	Local from Cumbernauld (return mid-day lunch train).
2.30	Express from Aberdeen.
3.15	Express from Aberdeen.
3.53	Saturdays only, from Larbert.
4. 7	Express from Aberdeen.
4.20	Express from Balquhidder and Gleneagles
4.32	Local from Cumbernauld.
4.38	Express from Oban.
4.50	Express from Inverness.
5.15	Express from Aberdeen.
6. 0	Stopping train from Larbert.
6.22	Express from Crieff and Gleneagles.
6.44	Express from Aberdeen.
7.15	Express from Aberdeen.
7.54	Local from Cumbernauld.
8.22	Express from Oban.
8.40	Local from Larbert.
9.15	Express from Inverness.
9.24	Express from Aberdeen.
9.50	Express from Oban.

During the winter months many of those

Digitized by Google



STATION SIGNAL BOX, SHOWING DOBBIES' LOAN BRIDGE AND SIGNALS.



GOODS STATION LINES BEYOND DOBBIES' LOAN BRIDGE.

Digitized by Google

trains which form groups, including Aberdeen, Dundee, Inverness and Oban sections, are combined, so that the winter arrangements are correspondingly lessened, though the Aberdeen and Dundee expresses are heavy all the year round. It is, however, occasionally necessary to duplicate such trains, and when there are public holidays, although not in the summer season, relief and divided trains become the rule, especially when a Saturday is included. Thus, for the last Glasgow Fair Holidays, there were 14 additional trains on the Thursday, 19 on the Friday, and 15 on the Saturday. The need for duplication also arises in the summer season, when very large numbers of passengers are dealt with. For instance, on a recent summer Saturday, the following sequence of trains had to be handled:

p.m.		
7.23	From	Aberdeen.
7.30	,,	Oban.
8. 0	,,	Inverness.
9. 9	,,	Inverness.
9.21	,,	Dundee.
9.27	,,	Aberdeen.
9.50	,,	Oban.
10.10	,,	Aberdeen.

These were, moreover, all heavy trains, so that it was necessary to detach the rear vehicles in the case of some of them and place them elsewhere for unloading, as the main trains were too long for the platforms to which they were brought, while it is usual, at such times, if the trains are double-headed, as is frequently the case, to detach the pilot at Milton Road Junction (St. Rollox) so as to save platform space at Buchanan Street.

Besides the standard passenger trains, there are several transfer services between Buchanan Street and Central. Thus, a parcels train leaves Central at 8.27 p.m., and is due at Buchanan Street at 8.57 p.m., making a circuitous route, with parcels for the north. There is also one from Central at 10.55 a.m., which also brings the Pullman restaurant car for the 1.30 p.m. to Aberdeen. This is due to the fact that the Glasgow portion of the 7.50 p.m. from Aberdeen runs to Central instead of Buchanan Street. There is also a fish train from Buchanan Street at 6.35 p.m. to Central, and at 10.42 a.m. a milk train arrives from Carstairs and the south. There are also occasional other trains not conveying passengers, so that, in the summer, Buchanan Street can be a very busy station, and all the year round it has its pressure periods. It is, however, essentially a long-distance traffic station, and, as such, is extensively used by business travellers, as well as by tourists and holiday-makers. It is used by a number of local season-ticket holders, and by substantial numbers of longer-distance residential travellers, particularly those residing at Larbert, Stirling, Dunblane, Crieff and Callander and intermediate stations, while a fair number travelling more or less frequently between Glasgow and Gleneagles use Buchanan Street.

Mr. Robert Walker Kelly, Stationmaster, entered Caledonian Railway service at Broughton, on the Peebles branch. He served as a guard for 12 years, including three as a through guard on the London trains, after which he became an Inspector at Glasgow (Central). He was

MR. R. W. KELLY,

Stationmaster,

Buchanan Street, Passenger Station.

Digitized by Google

then Stationmaster at Bromfield, on the Solway line, and at Cleghorn, after which he returned to Glasgow (Central) as Assistant Train Inspector, attached to the Divisional Superintendent's Office. He was then Joint Inspector at Carlisle for four years, and Assistant Stationmaster at Glasgow (Central) for five. He was appointed Stationmaster at Buchanan Street in 1919.

His staff at Buchanan Street includes 2 Inspectors, 13 clerks, 2 foremen, 8 signalmen, 4 ticket collectors, 3 excess luggage collectors, 19 porters, 5 porter guards, 12 guards, 10 shunters, 2 left luggage attendants, 5 female linen equippers, and 1 parcels van man. Parcels cartage is done by Wordie & Co., while the refreshment rooms are under Mr. Turier.

ENTRANCE TO BUCHANAN STREET GOODS STATION.

Buchanan Street Goods Station.

The main entrance is between the passenger station and the old headquarters offices, behind which it extends. It covers an extensive area, and is in three main sections, each having its own group of shunting lines until they merge beyond Dobbies' Loan Bridge to join the passenger lines at the mouth of the tunnel up to St. Rollox.

The three main sections are known, respectively, as English Forwarding, Scottish Receiving and North of Scotland Forwarding, and English Receiving and Local Foundry. There is also a large granary and a potato shed. The three sheds together can accommodate 268 wagons under cover, the granary and potato shed bringing the total to 290, while 194 further wagons can be loaded or unloaded in the open. Some 10,500 consignments are handled daily, a tonnage of about 2,000 per day. Transfer traffic amounts to about 500 tons.

The station is concerned only with merchandise of a general character, coal and other special traffic being dealt with elsewhere. It is, however, affected to some extent by seasonal traffic, particularly fruit, which represents big totals in the aggregate. About 20 wagons of fish are also handled daily. Crane power is available up to 20 tons. There are 13 booked trains leaving the station daily, with about 400 wagons, and 18 are due in, bringing about 500 wagons. In a day in September the actual numbers were—Received, 563 wagons; Despatched, 424 wagons. The train departures include three for the Carlisle direction, one to Edinburgh and one to Perth (mainly for Highland traffic); and the arrivals, seven from the Carlisle direction, with others from Grangemouth, Aberdeen and Dundee. These trains are, of course, duplicated or amplified as required.

Digitized by Google

Among the principal departures are the 7 p.m. for Carlisle, conveying traffic for delivery in Liverpool, Manchester, &c., next morning; and the 7.8 p.m. for Inverness, giving deliveries next morning in the north of Scotland; also the 7.45, 10.45 p.m. and 12 midnight trains for England. All these trains are operated in view of the special point made by the L.M.S.R. of providing for next-morning deliveries wherever practicable, a service upon which great stress is laid.

Each of the three main sections has a goods shed capable of accommodating 63, 95, and 88 wagons respectively, while a veranda, forming an annexe to the centre shed, accommodates 22 wagons, and the granary and the potato shed each gives further covered accommodation to 14 and 8 wagons, respectively, a total of 290 wagons under cover. In addition, the number of wagons which can be in position in the open for loading and unloading is 194.

Each of the three sheds has an overhead warehouse, and is equipped with hydraulic or electric hoists. A good part of the warehouse space is, however, let to private traders, especially that used for the storage of biscuits, printing paper, chocolate, soap, condensed milk and other goods, the stocks of which are drawn upon as required to meet local requirements.

There are six lorry weighing machines, in three sets of two, with office between, while there are hydraulic cranes on all the loading banks in two sheds, with overhead electric cranes in one of the sheds. About 457 lorries arrive in the station with loads for despatch daily, and about 585 loads are allowed.

Cartage is done partly by Wordie & Company, which firm has, from the very earliest days, been so closely associated with the Caledonian Railway, but most is done by railway company's teams. The great majority of the traffic is still horse-hauled, which is particularly suitable, not only for miscellaneous working in the streets of the industrial and trading districts of Glasgow, but also suits the policy of standing the lorries for loading and unloading, detaching the horse after a lorry has been placed in position and attaching it only when the load is made up. About 200 railway horses and 150 of Wordie & Co.'s are regularly employed. There are also five railway motor lorries, while those of Wordie & Co. work to and from Buchanan Street as required, also horse-drawn and motor vans of other firms who deliver to or collect from Buchanan Street themselves.

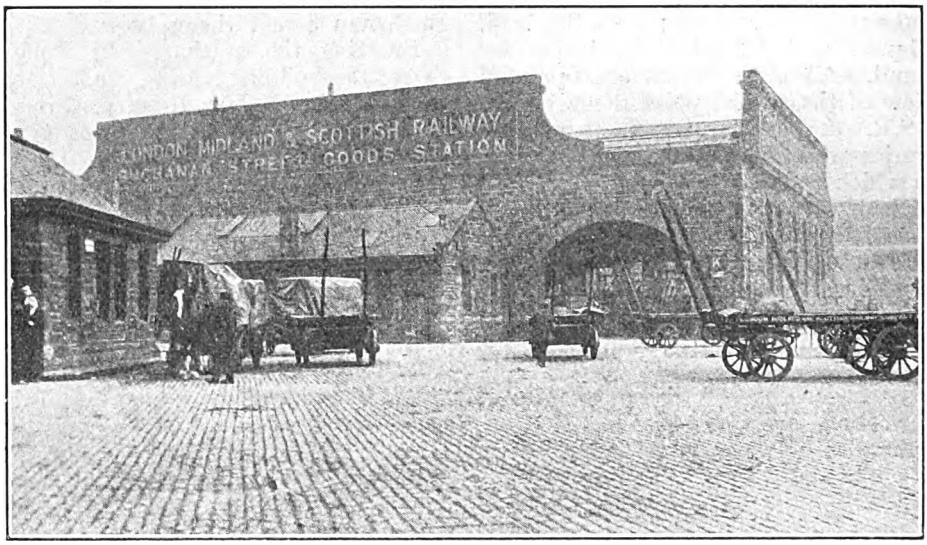
Entering the station from Buchanan Street the building seen to the left accommodates the Public Inquiry, Order and Discrepancy Offices, and upstairs the Claims Department. Behind that and directly alongside the passenger station is the English Forwarding Shed, which has three loading tables or decks signified by the letters "A," "B," and "C," and has also under its roof a line of rails with roadway permitting of loading and unloading direct from or to road vehicle and rail vehicle. Passing farther into the station one sees two lines of rails in the open suitable for unloading or loading a rougher class of goods. Here also is seen the crane with the highest lifting capacity, which the station possesses.

Proceeding farther into the station there is now seen a three-storey building which accommodates, on the ground floor, the Cartage Office, and the Shipping Correspondence Office. On the first floor is the Superintendent's Office, Cashier's and the General Offices. On the top floor is the Shipping Office. Behind this block of buildings is found a shed with five platforms, two centre roadways serving four of the platforms and an outside roadway with veranda serving one platform. These platforms are designated "D" "E," "F," "G," H." The five lines here found under cover accommodate 95 wagons. In this shed is dealt with traffic from Scottish stations generally, and traffic to the Scottish stations situated north of Glenboig.

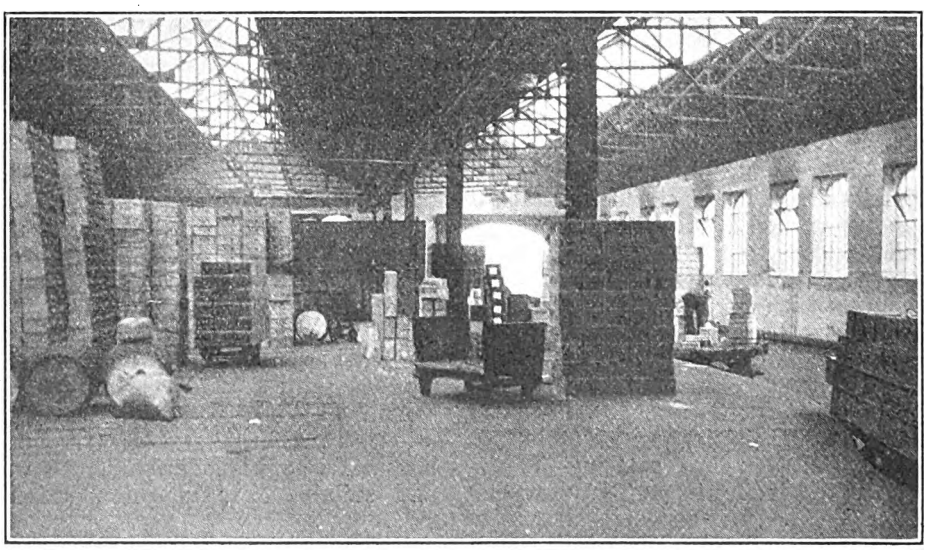
Passing still farther into the station there is seen the Granary, a building of five storeys, with a floor capacity of 8,000 square yards. It is equipped with hydraulic jiggers, chutes, and electric lift. It has inside accommodation for 14 wagons and suitable siding accommodation outside.

Beyond the Granary is a double-sided outside loading bank accommodating 17 wagons, and next to that is the Potato shed (8 wagons). In this area is found the pump house, where the hydraulic power for the cranes and hoists is regulated by an

Digitized by Google

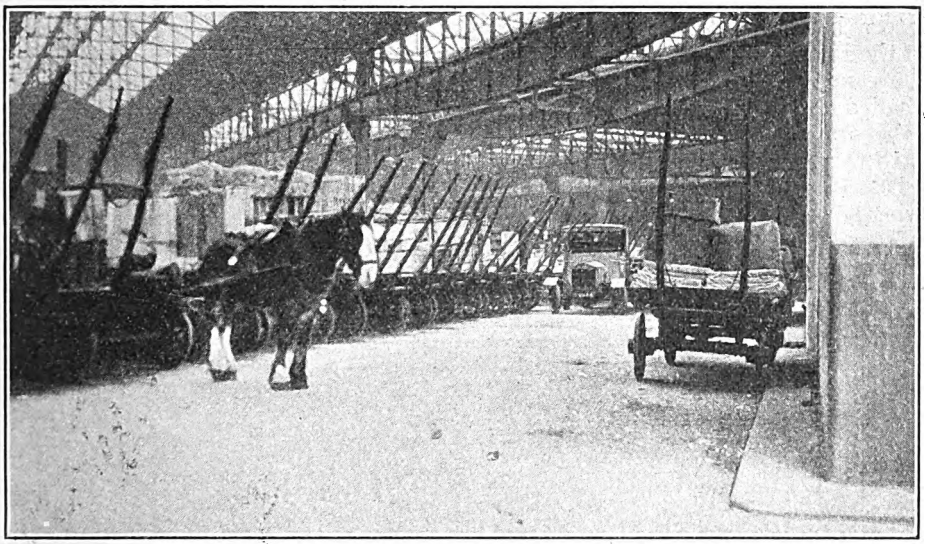


EXTERIOR OF "K" SHED.

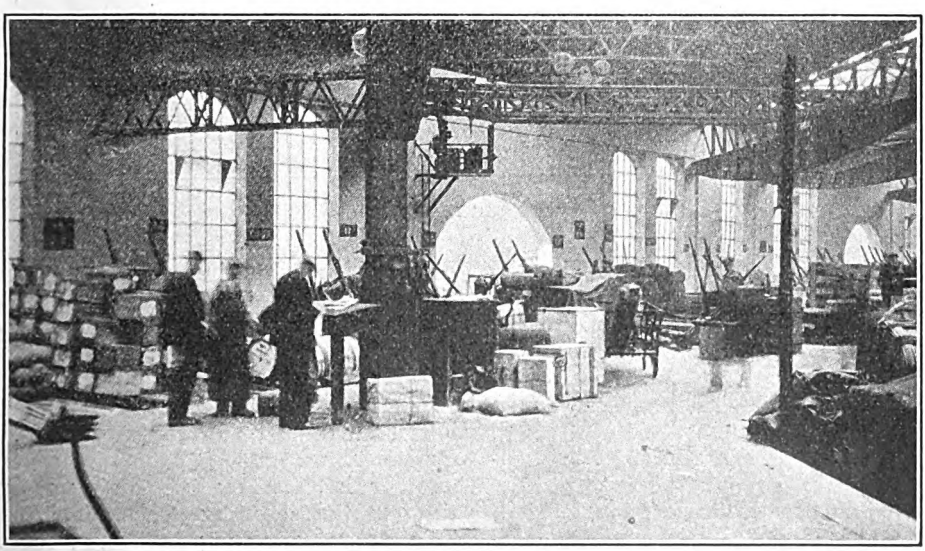


WAREHOUSE FLOOR OF "K" SHED

Digitized by Google



LORRIES STANDING FOR LOADING IN "K" SHED.



ON THE LOADING PLATFORM IN "K" SHED.

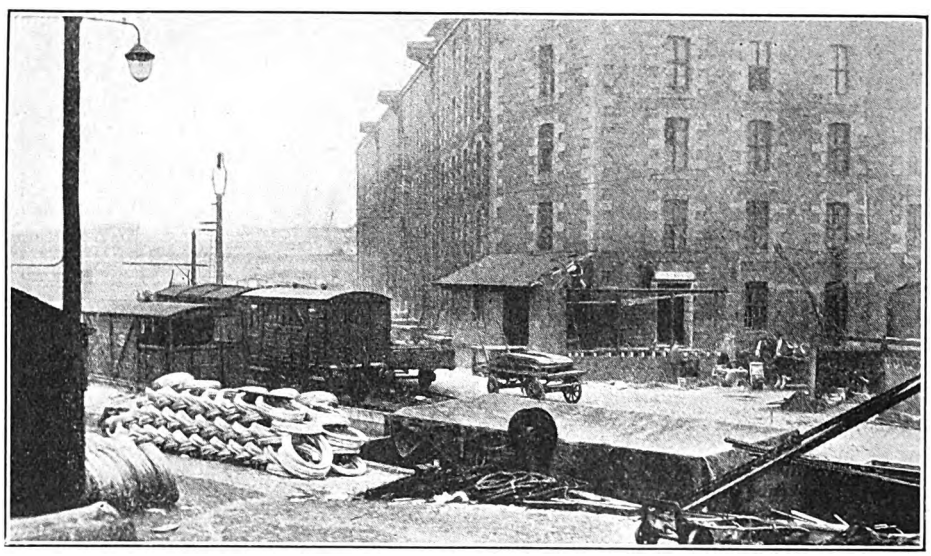
Digitized by Google

automatic electrical installation. In this section is found a number of storage sidings taking in 64 wagons. Next we see a wide roadway giving direct access as between road vehicle and wagons, 39 of the latter being accommodated on each side of the roadway.

We are now confronted with the third shed, called the "K" shed. Here is dealt with the traffic from England, and the traffic to the local Scottish stations. The shed has 12 platforms, together accommodating 88 wagons. All the lines emerge through stepped walls to an outside shunting neck, the lines terminating inside in "echelon" fashion, the platforms between all joining on to the main distributing platform, itself at an angle to the tracks. There is a cart road outside this platform, so that quite lengthy lorry standage and road space is available, while a barrow stage enables any wagon to be reached from any part of the shed. There are three overhead electric travelling cranes of two tons' capacity.

The building is rather curiously located, in that while it is on a level with the adjoining street—Parliamentary Road—the storage above the shed is on a level with Dobbies' Loan, thus giving cartage access to the store. This position has been reached by excavation into the rising ground. The "K" shed is particularly well adapted for the "stand-loading" of lorries, as each lorry can be reached by barrow from any part of the shed. The Delivery Office, in charge of Mr. Lockhart Mitchell, is attached to this shed.

From the respective goods sheds the shunting lines extend through different spans of Dobbies' Loan Bridge, and each is able to deal with its own shunting movements independently until connections are made beyond this bridge with connections towards the running lines from the passenger station and the tunnel up to St. Rollox. Beyond the bridge there are also sidings for shunting facilities. For two of the three shifts into which the day is divided four shunting engines are continuously employed, and three for the third shift. The yards are known, respectively, as Old, Middle and New. Train engines also render a little assistance in the final making up of trains and in the initial breaking up of those arriving. A good deal of transfer from one shed to another is done by exchanging wagons through the shunting necks. There are 34 platform weighing machines, located as required.



THE GRANARY.

Goods traffic is handled for the most part by hand-barrows of two-wheeled "rack" type, but use is made of several electric trucks. Incidentally, a Karrier motor sweeper is used for sweeping the cart roads

Digitized by Google

and the open portions of the depot. Hoists are freely provided to connect the loading banks with the warehouse floors.

The English shed has 25 hydraulic cranes of 30 cwt. capacity, and three for loads of 6 cwt. The Scotch shed has 36 of 20 cwt. and four of 40 cwt. capacity, all hydraulic, while the three overhead electric cranes in the "K" shed can deal with 40-cwt. loads. A good feature of each of the sheds is the amount of daylight received through the glazed roofs.

The Agent in charge at Buchanan Street is also responsible for a number of sidings at points in the vicinity, whose traffic is associated with that of the main station.

Mr. G. S. Paterson is Agent in charge; Mr. Locke, Assistant; and Mr. Adam Anderson, Chief Clerk. There are 3 chief foremen, who, in turn, take charge of the work in general, and 3 shed foremen. The yard staff includes 3 yard inspectors, 2 yard foremen, and 23 shunters, porters and checkers numbering about 425. The clerical staff numbers 145. Financial and General Accounting is not, however, done at Buchanan Street, but at the General Accounts Office in Howard Street, Glasgow.

The station is bordered from Buchanan Street first by Germiston Street, alongside the headquarters offices, and then by Killermont Street at right angles, thus leading into Parliamentary Road, which constitutes the boundary as far as Dobbies' Loan roadway and bridge. There are, however, several intervening sections of non-railway property on Parliamentary Road, along which may also be noted the offices of the Horse and Carting Superintendent, a secondary entrance to the goods station, and the Northern Division Audit Office. From Dobbies' Loan there is a third entrance, that to the upper warehouse floor of "K" shed already mentioned. On the further side the area is, of course, bounded by the passenger station and arriving lines.

In conclusion, the writer is indebted to Mr. Kelly, Stationmaster; Mr. Paterson, Agent; Mr. Locke, Assistant Agent; Mr. Anderson and others for valuable assistance and much useful information on the occasion of his visit to and inspection of Buchanan Street passenger and goods station, and to officers of the L.M.S.R. in London and in Glasgow for facilities for observing the work done and for co-operation in other ways.

LARBERT—AN IMPORTANT SCOTTISH JUNCTION.

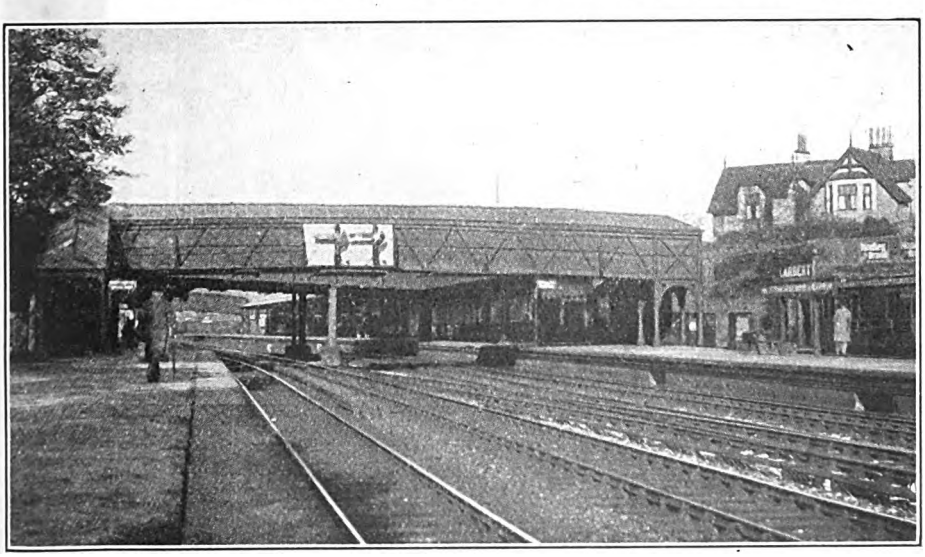
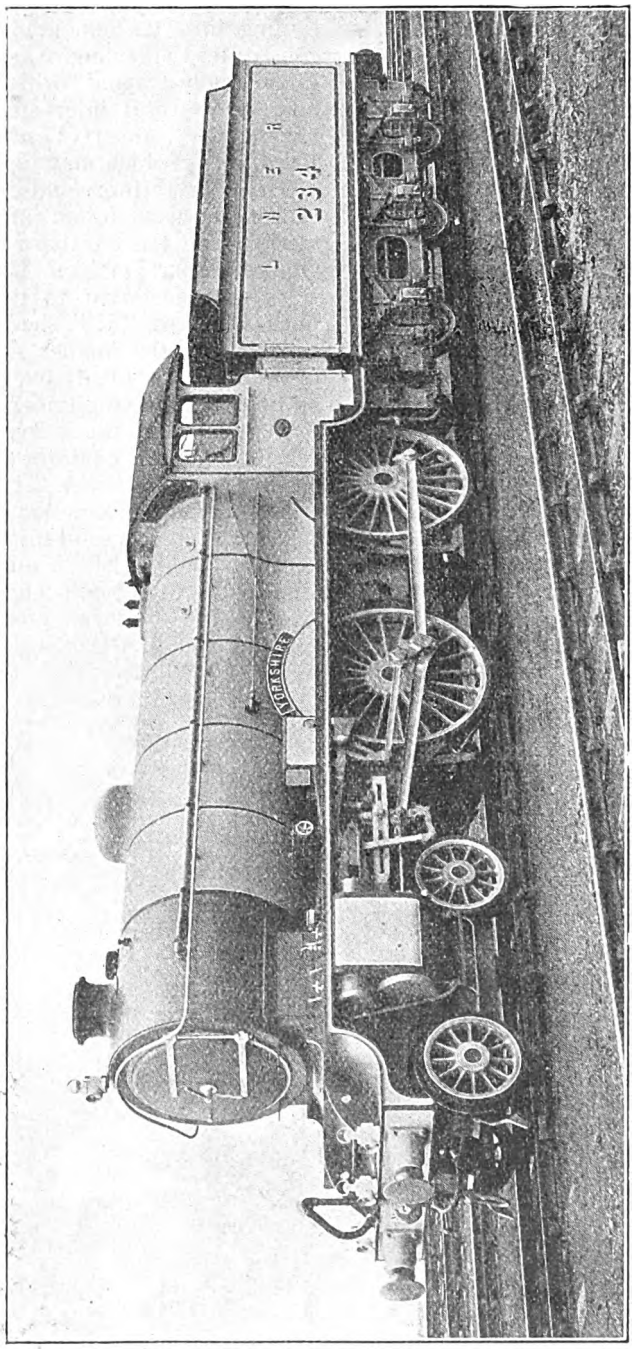


Photo.] [*J. F. Gairns.*

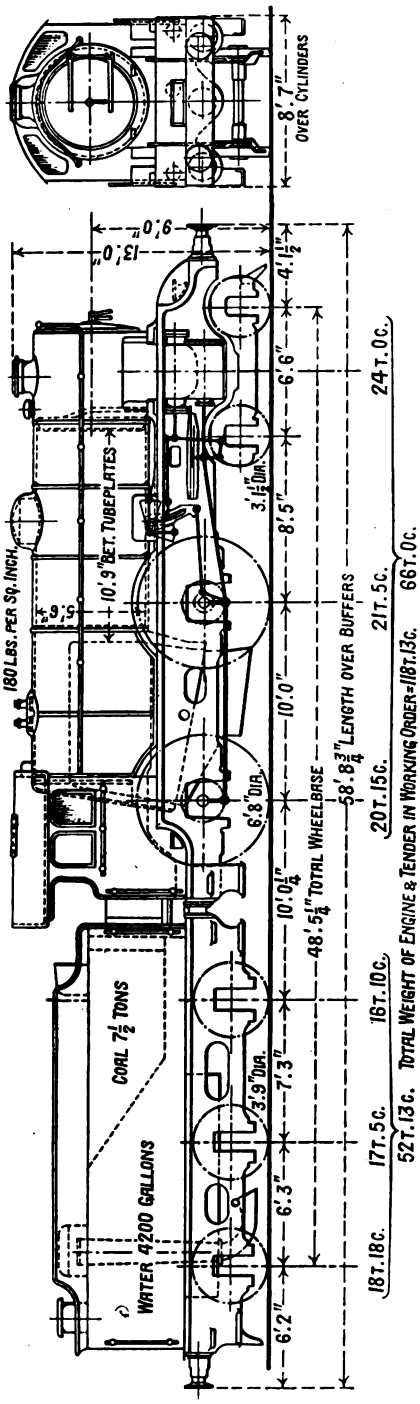
Digitized by Google



THREE-CYLINDER 4-4-0 EXPRESS LOCOMOTIVE, LONDON & NORTH EASTERN RAILWAY.

Digitized by Google

Three-Cylinder 4-4-0 Express Locomotives, L.N.E.R.



DIMENSIONED DIAGRAM OF THREE-CYLINDER 4-4-0 LOCOMOTIVE.

By the courtesy of Mr. H. N. Gresley, Chief Mechanical Engineer, London & North Eastern Railway, we are enabled to reproduce herewith a photograph and outline dimensioned drawing of the new 4-4-0 type express locomotive recently constructed to his designs at the company's works, Darlington. This engine belongs to a new series which is to be known as the "Shire" class, and is intended for express passenger traffic other than the heaviest of the main-line trains.

The cylinders are placed in line above the bogie centre, and steam distribution is effected by piston valves actuated by Walschaerts gearing, the motion for the inside valve being taken from the outside mechanism, in accordance with Mr. Gresley's well-known plan, which has been successfully applied to numerous other three-cylinder locomotives of his design. The arrangement is different from that on the Pacific and 2-6-0 engines which he has built, as the levers for operating the valves for the centre cylinder are located behind the cylinder instead of in front, thus eliminating the factor of expansion on the valve spindles which has to be taken into consideration when the mechanism for operating the middle valve is located in front of the cylinders. The return cranks of the outside gears are fitted with ball-bearing ends, and the details of the valve motion and other mechanism are similar to those of other London & North Eastern Railway express locomotives designed by Mr. Gresley. The diameter of the piston valve is 8 in. and maximum travel 6 in. at 65 per cent. cut-off, the steam lap for the outside cylinders being $1\frac{5}{8}$ in. and for the inside cylinder $1\frac{11}{16}$ in., with exhaust lap nil. The cylinder horse-power is given as 1,403.

The dimensions of the boiler can be gathered from the outline diagram, and, as seen, they are of an ample character. The centre line is placed at 9 ft. above rail level. The M.L.S. superheater fitted comprises 24 elements giving a heating surface of 246·1 sq. ft., the total heating surface, including superheater, being 1,643·88 sq. ft., with grate area 26 sq. ft.

Digitized by Google

and boiler pressure 180 lb. per square inch. The boiler horse-power is 1,056.

The following are the principal particulars :—

Cylinders (three)—	
Diameter	17 in.
Piston stroke	26 in.
Wheels, coupled, diameter ..	6 ft. 8 in.
Wheelbase—	
Rigid	10 ft. 0 in.
Engine	24 ft. 11 in.
Engine and tender ..	48 ft. 5¼ in.
Boiler—	
Diameter of barrel ..	5 ft. 6 in.
Length of barrel	11 ft. 4⅝ in.
Tubes—	
Small, No.	177
Diameter, outside ..	1¾ in.
Thickness	11 I.W.G.
Superheater flues—	
Diameter, outside ..	5¼ in.
Thickness	5/32 in.
Length between tube plates	10 ft. 9 in.
Heating surface—	
Firebox	171·50 sq. ft.
Small tubes	871·75 sq. ft.
Superheater flues	354·53 sq. ft.
Total evaporating heating surface	1,397·78 sq. ft.
Superheater, elements—	
No.	24
Diameter, inside ..	1 3/32 in.
Heating surface.. ..	246·1 sq. ft.
Combined heating surface	1,643·88 sq. ft.
Grate area	26 sq. ft.
Boiler pressure	180 lb. per sq. in.

The diagram also shows that the engine in working order weighs 66 tons without tender, of which 42 tons are available for adhesion, the driving pair of wheels supporting 21 tons 5 cwt.

The engine develops a tractive effort, at 85 per cent. boiler pressure, of 21,556 lb., and the ratio of adhesion to tractive effort is 4·36.

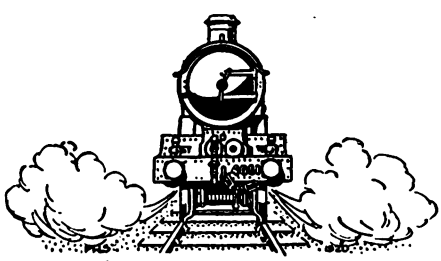
The equipment of the locomotive includes Ross patent " pop " safety valves, Wakefield mechanical lubricator, M.L.S. superheating apparatus, Westinghouse brake and vacuum ejector, Davies & Metcalfe exhaust steam injector.

The tender is of the standard L.N.E.R. six-wheel pattern, but fitted with disc instead of spoked wheels. The water capacity is 4,200 gallons, and coal capacity 7½ tons. The wheels measure 3 ft. 9 in. diam. on tread distributed over a wheelbase of 13 ft. 6 in. The tender is fitted with water pick-up apparatus, and weighs loaded 52 tons 13 cwt., giving a total for engine and tender in working order of 118 tons 13 cwt.

We understand that an order for 28 of these locomotives is being completed at the Darlington works, and that some of their number will be fitted with Lentz poppet valves for steam distribution to the cylinders. It has been decided that the following names will be allocated to them :

Hertfordshire	*Roxburghshire*
Buckinghamshire	*Fifeshire*
Leicestershire	*Perthshire*
Warwickshire	*Argyllshire*
Huntingdonshire	*Berwickshire*
Bedfordshire	*Lanarkshire*
Nottinghamshire	*Lancashire*
Kinross-shire	*Inverness-shire*
Oxfordshire	*Dumbartonshire*
Stirlingshire	*Cambridgeshire*
Peeblesshire	*Lincolnshire,*
Aberdeenshire	*Yorkshire*
Forfarshire	*Derbyshire*
Banffshire	*Kincardineshire*

The engines named after the Scottish counties will operate in Scotland, the others being employed mainly for intermediate services, and principally in the north-eastern district of England.



Digitized by Google

British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

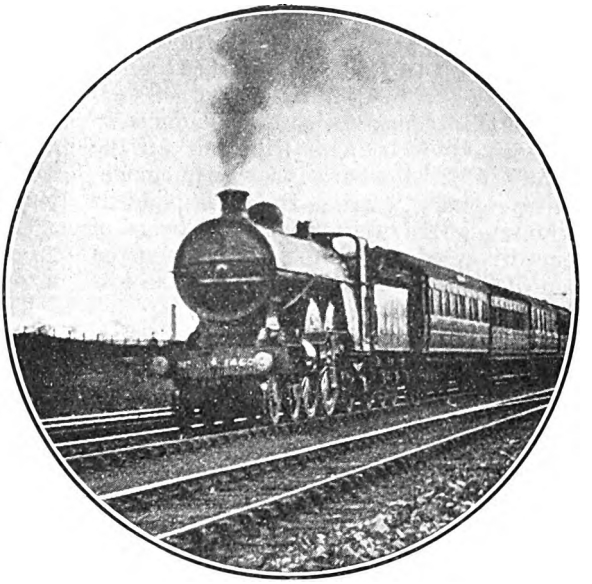


Photo.] [*J. F. Dearden.*

DOWN NEWCASTLE EXPRESS, L.N.E.R.

4-4-2 locomotive No. 4460.

IT is by now a more or less traditional usage that in the month of January our consideration of locomotive performance should be transferred north of the Border, and I will therefore plunge without delay *in medias res*. For the second year in succession my Scottish travels have been very limited in character, but once again correspondents have come to the rescue with a will, sending me a mass of material which is, in fact, too extensive to be detailed here in its entirety. So far as the L.M.S. runs in Scotland are concerned, the data about to be reproduced constitute, in large measure, a decided eulogy of the work of the Midland compounds. One mentions the fact almost with bated breath, but the Scottish drivers appear to be capable of extracting harder work out of these engines than that to which they are put even on their parent system. True, I have lately timed runs on the Midland Division on which net time has been kept, or all but kept, on the 107-minute booking from Leicester to St. Pancras with the hitherto unheard-of load of 310 tare tons (eleven corridor bogies), and with comparative ease ten bogies have been worked to time on the fastest bookings in both directions.

But it is noteworthy, in comparison with this, that in future the Scottish compounds are to be expected to work 400-ton trains on the normal schedules in force between Carlisle and Dumfries, over the G. & S.W. Section of the L.M.S., and 340 tons in each direction between Dumfries and St. Enoch. The bookings over these sections are not so fast, of course, as those operating between St. Pancras and Leicester, but for severity of grading the Scottish main line would leave the Midland far behind. On the southbound journey, in particular, Neilston bank, with its 3½ miles at 1 in 67 to 70, preceded by a mile at 1 in 100, would seem a tremendous proposition for a 4-4-0 engine hauling a gross load which might reach 365 or 370 tons; and so would the 4¼ miles at 1 in 100 from Hurlford up to Mossgiel Tunnel. Similarly in the northbound direction, the continuous ascent of 27½ miles from Holywood to beyond Kirkconnel, mostly at 1 in 150 to 200 (6 miles at the former figure and 12½ at the latter), and broken only by the undulating 4½ miles from Carronbridge Tunnel up the Nith Valley, and the 2½ level miles beyond Sanquhar, is a stiff section for any 4-4-0 engine so loaded, let alone the

Digitized by Google

shorter but gruelling climb from Kilmarnock up to Dunlop, with its 1½ miles at 1 in 87 and 2 at 1 in 75. Whether such load limits continue in force remains to be seen. "A train of 340 tons up the 1 in 67 of Neilston bank is asking too much, in my opinion," writes the correspondent who sends this information. "I heard of one driver who tried 328 tons unassisted out of Glasgow the other day, and he lost 15 minutes to Carlisle," he adds.

What the compounds can do with assistance is clearly indicated by a trip, of which the same correspondent sends skeleton times, in which No. 914, piloted from Dumfries by 4-4-0 No. 14145, and hauling 324 tare tons or 345 full tons, made the run of 58·1 miles from there to Kilmarnock in the even hour, thereby gaining 13 minutes on the booked time then in force. From there 13 min. to Dunlop, a 2-min. stop there to detach the pilot, and 21 min. down to Glasgow, made up a time of 36 min., instead of the 39 min. allowed by timetable, which, however, included a conditional stop, not made, at Strathbungo. From the Carlisle start No. 914 had worked the 345-ton train, unaided, over the 17·6-mile stretch to Annan (also a conditional stop) in 21 min., and after stopping a minute there, had completed the 15·5-mile run to Dumfries in 19 min. more, making a total of 41 min. from Carlisle to Dumfries, instead of 43 min. then allowed. The result of this fine running, coupled with a reduction of a minute in the 5-min. stops at both Dumfries and Kilmarnock, was to convert a late start of 18 min. from Carlisle into an early arrival by 2 min. at St. Enoch—a total economy on time of 20 min.

This was on September 24, with the 4.21 p.m. out of Carlisle, and on October 25 the same driver—F. Haugh—with No. 913, hauling the 6.34 p.m. train, made some even more astonishing running, this time unassisted, after a late start of 31 mins. from Carlisle. With a train of 188 tare tons, and about 200 tons gross, Haugh ran the 33·1 miles from Carlisle to Dumfries in 33 min. start-to-stop, the 58·1 miles from Dumfries to Kilmarnock in the extraordinary time of 59 min. (New Cumnock, 36·9 miles, was passed in 39 min., despite a p.w.r. check at Closeburn, and a severe signal check was experienced subsequently at Hurlford), while the Kilmarnock-Glasgow stretch was run in 30 mins. Stopping times at Dumfries and Kilmarnock were exceeded by 5 min., so that the actual time picked up on the new winter schedule was 21 min.; but the engine

Photo.] [*W. Leslie Good.*

DOWN "ROYAL SCOT" EXPRESS NEAR TAMWORTH, L.M.S.R.

3-cylinder 4-6-0 No. 6125, "Royal Scot" class.

Digitized by Google

had regained 26 mins., and the net gain was probably half an hour at least. It is a pity that some competent observer was not present on the train to set these wonderful feats on detailed record; had the second run been non-stop, it is pretty certain that Glasgow would have been brought within less than 2 hours of Carlisle, even over the 115½ miles of the G. & S.W. route.

No such distinguished running appears in the table reproduced herewith, the trains concerned being for the most part on time, with little call for enterprise on the part of the drivers. On my south-bound journey with the 9.15 p.m. express, hauled,

L.M.S. (G. & S.W. Section) Glasgow—Carlisle.

Distances.		Engine: 3-cylinder Compound 4-4-0 No. / Pilot Engine No. / Load (axles) / ,, (tons tare) / ,, (tons full)	Schedule.	915	Schedule.	1149	1065	Schedule.	1069	Schedule.	1068	1069
		Pilot Engine No.		—		†14476	‡14317		—		—	—
		Load (axles)		32		*40	§44		28		32	33
		,, (tons tare)		220		*260	§300		188		214	223
		,, (tons full)		230		*275	§320		200		225	235
miles.	miles.		m.	m. s.	m.	m. s.	m. s.	m.	m. s.	m.	m. s.	m. s.
0·0	24·4	Glasgow	0	0 00	0	0 00	0 00	41	43 09	35	33 20	35 10
1·9	22·5	Strathbungo	4	4 35	4	3 51	3 50	36	sigs.	31	29 40	31 20
5·9	18·5	Nitshill	—	9 45	—	8 51	8 51	—	sigs.	—	25 30	26 50
7·6	16·8	Barrhead	11	11 40	11	10 40	10 52	26	25 06	24	23 35	24 55
9·7	14·7	Neilston	—	15 00	—	13 47	14 18	—	22 47	—	21 15	22 50
12·8	11·6	Caldwell	—	20 15	—	18 52	19 13	—	19 16	—	17 50	19 25
14·4	10·0	Lugton	23	22 20	23	20 48	21 06	17	17 19	16	15 55	17 35
16·7	7·7	Dunlop	—	25 15	—	23 48	24 01	—	14 29	—	13 15	14 50
18·9	5·5	Stewarton	—	27 40	—	26 39	26 38	—	10 03	—	9 35	10 20
22·1	2·3	Kilmaurs	—	30 45	—	29 47	29 52	—	4 27	—	4 45	4 55
24·4	0·0	Kilmarnock	34	33 50	34	32 42	33 03	0	0 00	0	0 00	0 00
0·0	58·1	Kilmarnock	0	0 00	0	0 00	0 00	72	64 50	73	72 25	70 00
1·8	56·3	Hurlford	—	3 50	—	3 38	4 00	—	62 31	—	69 45	67 28
9·4	48·7	Mauchline	15	15 10	16	15 37	15 55	60	55 10	61	60 40	59 15
13·8	44·3	Auchinleck	—	20 15	—	20 47	21 37	—	50 37	—	55 51	54 35
15·8	42·3	Old Cumnock	—	23 05	—	23 08	24 20	—	48 24	—	52 35	52 15
21·2	36·9	New Cumnock	33	30 20	33	29 43	31 22	47	42 16	47	46 10	46 40
				p.w.s.								
28·6	29·5	Kirkconnel	—	38 25	—	37 58	39 01	—	34 15	—	38 15	38 05
32·0	26·1	Sanquhar	44	42 00	44	41 15	42 19	33	30 52	33	34 10	34 20
40·6	17·5	Carronbridge	—	52 05	—	49 58	51 12	—	21 44	—	23 50	24 00
43·9	14·2	Thornhill	57	55 55	58	54 18	55 10	18	17 37	18	19 00	19 15
46·6	11·5	Closeburn	—	58 45	—			—	14 24	—	15 30	15 40
50·5	7·6	Auldgirth	—	62 50	—	—	See	—	10 01	—	10 45	10 45
54·7	3·4	Holywood	—	67 10	—	—	Note	—	5 30	—	5 55	5 50
							A.					
58·1	33·1	Dumfries	72	71 35	0	—	0 00	41	40 43	20	19 35	18 50
									sigs.			
3·9	29·2	Racks	—	6 30	—	—	5 55	—	31 50	—	14 35	13 55
8·5	24·6	Ruthwell	—	12 05	—	—	10 51	—	27 13	—	9 35	9 15
12·1	21·0	Cummertrees	—	15 45	—	—	14 03	—	23 30	—	5 35	5 30
15·5	17·6	Annan	20	19 55	19	—	17 08	22	20 13	21	21 00	20 15
18·5	14·6	Eastriggs	—	5 15	—	—	19 58	—	17 16	—	17 35	17 00
21·4	11·7	Rigg	—	8 35	—	—	22 58	—	14 09	—	14 35	14 10
							sigs.					
24·4	8·7	Gretna Junction	12	12 35	30	—	27 54	12	10 53	11	11 05	10 55
29·0	4·1	Rockcliffe	—	17 40	—	—	32 52	—	6 20	—	6 35	6 25
							sigs.					
33·1	0·0	Carlisle	23	22 50	42	—	39 50	0	0 00	0	0 00	0 00

A: Engines, Dumfries to Carlisle:—4-4-0 compounds Nos. 914 and 1065; load 52 axles, 350 tons tare, 380 tons full.

* 36 axles, 233 tons empty, 245 tons full, Kilmarnock to Thornhill.

† Cal. section (Pickersgill) 4-4-0 ‡ Cal. section "Dunalastair I" 4-4-0.

§ 40 axles, 269 tons empty, 285 tons full, Kilmarnock to Thornhill.

Digitized by Google

singularly enough, by compound No. 915, we had a 32-axle train of 230 tons. Attaining 55 m.p.h. at Nitshill, we went up Neilston bank at a minimum of 27, steadily maintained, and, after a slight signal check at Lugton, and the usual slowing through Stewarton, touched 75 an hour before stopping at Kilmarnock. Further excellent climbing followed on the ascent to Mossgiel Tunnel, which brought us down from 50 to 34, while up the 3½ miles at 1 in 150—180 from Mauchline to Auchinleck speed fell from 57 to 41 m.p.h. At New Cumnock we were 2¾ min. before time, but so desperately cautious was the downhill running that we lost time slightly to Dumfries. From there to Carlisle there was no running of any note.

The next two runs were on the corresponding train on Sunday evenings, when there is a stop at Thornhill, and there my correspondent who had timed the runs alighted. This was before the new piloting regulations, and pilots were therefore provided to Kilmarnock on both occasions; both were Caledonian 4-4-0 engines, a Pickersgill superheated 4-4-0 in the first case and a "Dunalastair I" in the second. With the lighter of the two trains, Nos. 1149 and 14476 attained 59 m.p.h. at Nitshill, but fell to 28½ an hour on Neilston bank, tying in times from Neilston to Caldwell with those of the previous run. Nos. 1065 and 14317, however, with 320 tons, after attaining only 52 at Nitshill, did not fall below 30½ m.p.h. Across the Lugton table-land the maximum speed of the two runs was 57 and 58½ m.p.h. respectively, followed by minima of 42½ and 43½ an hour beyond Dunlop; maxima at Kilmaurs were then 73 m.p.h. and the modest figure of 64 an hour. Out of Kilmarnock both the compounds were unpiloted, and did well up the climb to Mossgiel, No. 1065's minimum of 32½ m.p.h. with 290 tons (from 46 at Hurlford) being particularly good; No. 1149 fell from 47½ to 30½ m.p.h. Onwards, No. 1149 touched 54 m.p.h. at Mauchline and No. 1065 only 48; speeds were 47½ (an excellent figure) and 42 an hour at Auchinleck; and once again very moderate downhill running followed, though No. 1149 did reach 70 m.p.h. below Sanquhar. Even then the gains on time from Kilmarnock to Thornhill amounted to 3¾ and 2¾ min.

The run from Dumfries to Carlisle was made on a later occasion, when the two Midland compounds Nos. 1065 and 914

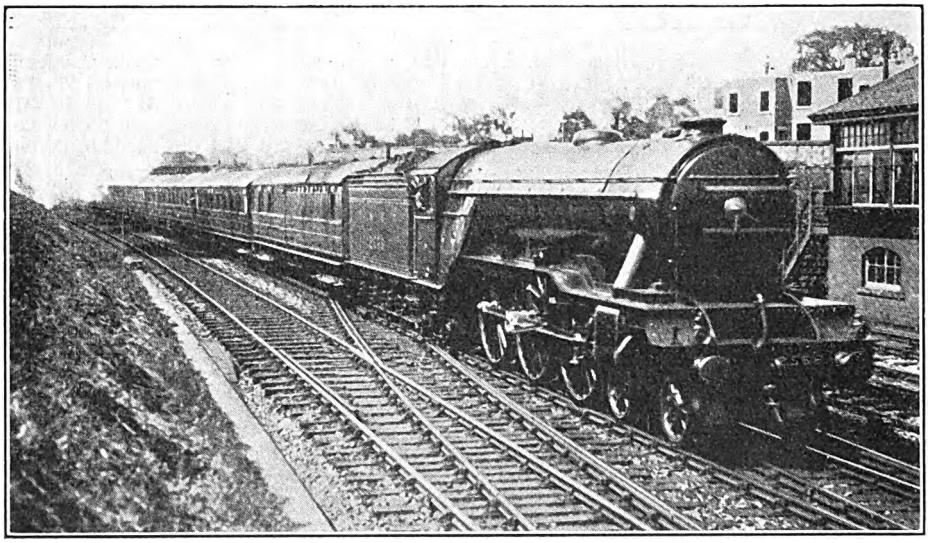


Photo.] [*Henry L. Salmon.*

1.45 P.M. EDINBURGH-KING'S CROSS RESTAURANT-CAR EXPRESS PASSING CRAIGENTINNY.

L.N.E.R. 4-6-2 No. 2566.

Digitized by Google

had a 380-ton train between them. Up 2½ miles at 1 in 150 from Racks to Ruthwell there was no greater drop in speed than from 58½ to 52½ m.p.h.—again very sound work—and the descent to Annan produced a maximum rate of 68 an hour. Checks spoiled the conclusion of the trip, but it is probable that the net time from Dumfries to Carlisle did not exceed 37 min., or 5 min. less than schedule.

In the reverse direction three runs are shown with moderate loads, and unpiloted compounds. The first of them, on the 6.34 p.m. express, was with a gross load of 200 tons only, and good efforts were made to regain arrears of time, although to a large extent these were nullified by signal checks and overtime at stations. The Carlisle-Dumfries run would have been made in 36¾ min., instead of the scheduled 41, but for a signal stop in Dumfries yard. Then from Dumfries to Kilmarnock the schedule of 72 min. was improved on by 7¼ min.; maximum and minimum speeds do not figure in the log, but the time of 42 min. 16 sec. from Dumfries up to New Cumnock was excellent, and especially the average of 49·1 m.p.h. up the six miles at 1 in 150 from Closeburn to Carronbridge. From Kilmarnock to Glasgow the net time, allowing for two very bad checks below Barrhead, was 35 min., representing another gain of 6 min. to engine, on the schedule then operating. The gross locomotive gains, therefore, amounted to 17½ min.—another splendid achievement.

The remaining two runs were on the 1 p.m. from Carlisle to Glasgow, and were of no special note. On that of No. 1068, timed by myself, we touched 62½ m.p.h. at Floriston, fell to 52 at Gretna Green, and reached 62½ again before stopping at Annan. Maximum in descending from Ruthwell to Dumfries was only 62½ m.p.h. After leaving Dumfries we attained 54 m.p.h. at Holywood, fell to 51 on the subsequent 1 in 200, and to 39 on the 1 in 150 at Carronbridge Tunnel; on the 1 in 180 to Sanquhar, and the 1 in 200 beyond Kirkconnel the lowest rates were 48 and 49 m.p.h. All downhill speeds were very restrained, and require no comment. Then we climbed excellently from Kilmarnock, attaining 41½ m.p.h. up the 1 in 180 to Kilmaurs, falling to 40 on the 1½ miles at 1 in 87 beyond, recovering to 43 on the mile at 1 in 152 before Stewarton, and then dropping finally to 32½ an hour up the 2 miles at 1 in 75 to Dunlop summit. This, with 225 tons

Photo.] [*C. J. L. Romanes.*

GLASGOW-CARLISLE TRAIN NEAR DUMFRIES (STRANRAER LINES TO LEFT.)
L.M.S. Compound 4-4-0 No. 916.

Digitized by Google

was excellent work, and resulted in a gain of 1¾ min. from Kilmarnock to Glasgow. On my correspondent's run with No. 1069, the last in the table, speeds were 60 m.p.h. at Floriston, 53½ at Gretna Green, and 65 before the Annan stop; then 51½ m.p.h. over Ruthwell Summit, and 66 before Dumfries. From the restart the engine reached 54 an hour at Holywood, fell to 47½ on the 1 in 200 and 41 on the 150, did not exceed 60 at Manock, and fell to 47½ on the 1 in 180 to Sanquhar and 49 on the 200 after Kirkconnel, after which came the usual leisurely descent to Kilmarnock. On the 1 in 75 to Dunlop the minimum rate was 25 m.p.h., the climbing here being inferior to that on my journey. Altogether it is clear that the Midland compounds have inaugurated a new era of express running on the Glasgow and South Western main line.

Over the Ayr line my only run was one on the 4.10 p.m. out of Glasgow, *en route* to Stranraer, wherein one of the Manson 4-6-0 engines—No. 14668—had to tackle a train of ten vehicles, including the recently-instituted restaurant-car from Glasgow to Stranraer, totalling 266 tons empty and 290 tons full, some well-filled non-corridor stock being included at the back of the train. We made the run of 30·6 miles from Paisley to Prestwick in 36 min. 55 sec., passing Howwood, 6·1 miles, in 9 min. 50 sec; Beith, 10·9 miles, in 15 min. 35 sec.; Dalry, 15·6 miles, in 20 min. 50 sec.; Kilwinning, 18·6 miles, in 24½ min.; and Barassie, 26·1 miles, in 31½ min. Maximum speed attained was 62½ m.p.h., at Bogside, and we ran the 14·0 miles from Dalry to Monkton in 14 min. 35 sec. The gain on time from Paisley to Prestwick was just over 3 min.

I would like to write at length of the Ayr and Stranraer section, with its appalling gradients, did considerations of space permit, but I must confine myself to one northbound run of which I have received details from a valued correspondent who resided, until recently, at Dalmellington. The train was the midday luncheon-car express which runs during the summer months, in connection with the day steamer service from Larne. The large Drummond superheated 6-ft. 4-4-0 engines are now working over this section, but over such gradients as the ascent from New Luce to mile-post 16½, which includes 3 miles continuously at 1 in 57, even a 26-axle train of 183 tons tare and 200 tons gross was provided with a pilot in the shape of the small-boilered Manson

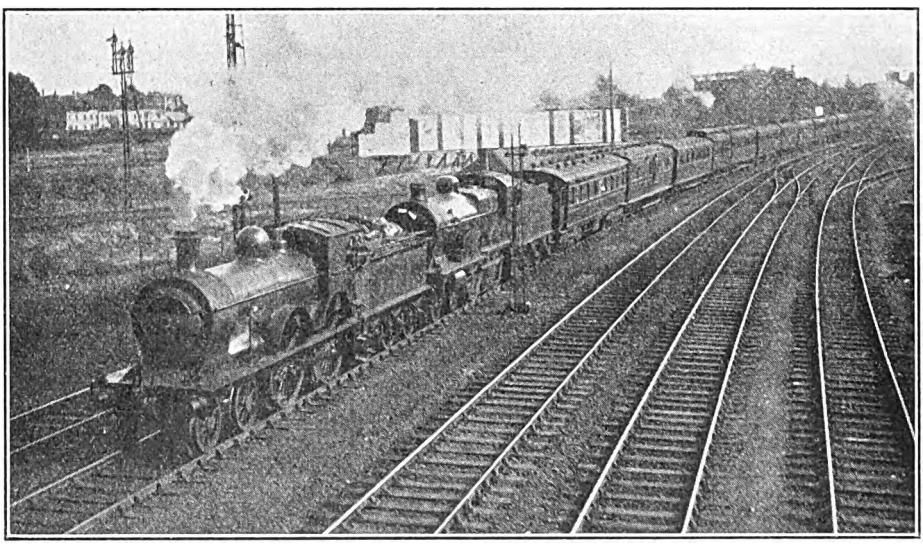


Photo.] [*C. J. L. Romanes.*

LONDON-GLASGOW (ST. ENOCH) EXPRESS LEAVING DUMFRIES.

G.S.W. 4-4-0 No. 14143 and L.M.S. Compound 4-4-0 No. 916.

Digitized by Google

No. 14180. The train engine was 4-4-0 No. 14521, driven by G. Thomson, of Girvan. The 4 miles from Castle Kennedy to Challoch Junction were run in 6 min. 40 sec., including a slack to 30 m.p.h. over the intermediate loop at Dunragit. There are 3½ ascending miles from the junction, first at 1 in 78 (from the junction slack to 28 m.p.h.), and then for 2 miles at 1 in 115, on which the maintained speed was 46 m.p.h. New Luce, 9·6 miles, was passed in 14 min. 20 sec., with a slack to 35 m.p.h. over the station loop, all this section, of course, being single line. Up the 3 miles at 1 in 57 the speed settled down to a steady 24½ m.p.h., mile-post 21¾, 13·2 miles from the start, being passed in 21 min. 18 sec., but the express was then stopped at Glenwhilly in order to cross a southbound freight train. The 13·9 miles to the stop had occupied 22 min. 40 sec., instead of the 26 min. allowed to passing this point.

From the stop, after standing 3 min. 20 sec., the two engines mounted the 4·5 miles to mile-post 16½, almost entirely at 1 in 100, in 7 min. 57 sec., maintaining 39 to 40 m.p.h. on the climb, and touching 64 m.p.h. on the subsequent descent, reached Barrhill, 8·5 miles from Glenwhilly, in 13 min. 20 sec. Here the pilot was detached, and No. 14521, after a stop of 2 min., proceeded unaided, first achieving the very smart starting time of 5 min. 15 sec. for the 4·2 sharply falling miles to Pinwherry; speed again reached 64 m.p.h., with frequent brake applications, but was reduced to 30 an hour through Pinwherry loop. There is now another tremendous bank, for 4 miles, to mile-post 4; up the initial ¾-mile at 1 in 100 No. 14521 recovered to 37½ m.p.h.; the next 2 miles, at 1 in 65, produced a steady minimum of 30 m.p.h., and after slacking to 26 m.p.h. through Pinmore loop, the engine recovered to 32 m.p.h. on the 1 in 80, and 34½ on the final 1 in 120 to the summit. Thus the ascent of 4·4 miles from Pinwherry to mile-post 4 was completed in 7 min. 53 sec.—a first-class achievement. Pinmore, 7·4 miles from Barrhill, was passed in 11 min. 10 sec., mile-post 4, 8·5 miles, in 13 min. 8 sec., and despite a p.w.r. check on the subsequent descent, Girvan, 12·3 miles, was reached in 18 min. 20 sec. For the non-stop run of 34·7 miles from Castle Kennedy the timetable allows 60 min.; the total running time was 59 min. 40 sec., the actual travelling time 54 min. 20 sec., and the net time about 52 min.

It may be added that the all-the-year-round evening boat express from Stranraer,

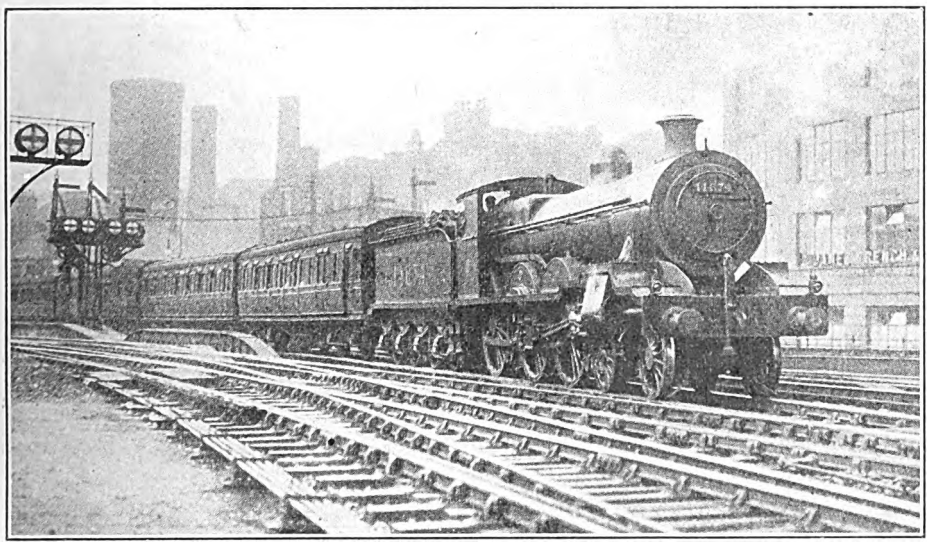


Photo.] [*P. Ransome-Wallis.*

GLASGOW-AYR EXPRESS LEAVING ST. ENOCH.

G.S.W. 4-6-0 No. 14674.

Digitized by Google

which now brings back to Glasgow the dining car off the 4.10 p.m. southbound train, made some excellent runs during the past summer. Engine No. 14514, of the earlier Drummond 6-ft. 4-4-0 type, since rebuilt with superheater, specially distinguished herself, under the handling of Driver G. McKissock, of Ayr. With a gross load of 190 tons on one occasion he passed Barrhill, 25 miles, in 43 min. from Stranraer Harbour and Pinmore in 53 min., reaching Girvan, 37·2 miles, in 61 min., or 11 min. less than schedule; with a 200-ton train and no assistance his total time was 65 min. On both occasions the very heavily-graded continuation run of 21·4 miles to Ayr was completed in 27 min., resulting in a further cut of 3 min. from schedule. With the assistance of a pilot McKissock succeeded in working a 280-ton train from Stranraer to Girvan in 58 min. —14 min. under schedule—and then achieved the most startling feat of all by working the same load, unassisted, from Girvan to Ayr in 28 min., despite a special intermediate stop at Maybole. On this last journey a late start of 25 min. from Stranraer Harbour, due to the tardy arrival of the boat, had been reduced to but 10 min. late on arrival of the train at Ayr. I shall hope some day to run across this enterprising driver, and first-hand to record some of his remarkable running.

Reference having been made to working over the Caledonian Section as recently as November last, I propose now to conclude with a few journeys over the London and North Eastern lines in Scotland, deferring the former till a later date. This plan will have the additional advantage of allowing me to obtain a few Scottish runs with the new "Royal Scot" type of the L.M.S., behind which it has not yet been my good fortune to travel north of the Border. A correspondent forwards details of a couple of trips from Carlisle to Edinburgh over the Waverley route, noteworthy in that one case a load in excess of the customary maximum for "Atlantics" was taken over Falahill from Galashiels to Edinburgh. Singularly enough, the same engine was assisted in rear from the Riddings start up the 1 in 100 to Penton, although over this stage with 260 tons only behind the tender.

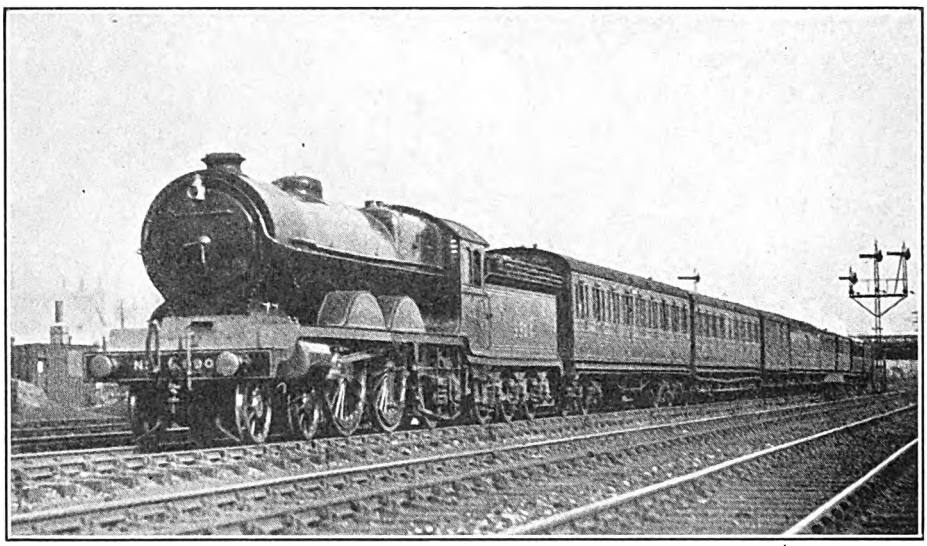


Photo.] [*F. R. Hebron.*

WAVERLEY ROUTE EDINBURGH-CARLISLE TRAIN, L.N.E.R.

N.B. 4-4-2 No. 9904.

Some of the intermediate bookings of the 1.5 p.m. from Carlisle to Edinburgh are very tight, in view of the route traversed, and *Waverley*, with her 260-ton train, lost small amounts of time, which, however, totalled no more than one minute

Digitized by Google

in all to Newcastleton, and this was recouped on the subsequent running to Hawick. A similar loss of 1¼ min. between St. Boswells and Galashiels was all but regained between the latter station and Edinburgh, despite an extremely heavy load, for the climb to Falahill, of 330 tons. On the first short run to Longtown, with its 1 in 100 rise to Kingmoor following on the tortuous start to Canal Junction, speed just exceeded 60 m.p.h. at Lyneside. After restarting from Longtown, the short 1 in 100 to Scotch Dyke was ascended at a minimum rate of 39½ m.p.h., and 52½ was touched before the stop at Riddings.

L.N.E.R. CARLISLE-EDINBURGH.

Engine 4-4-2 No. ..	9876	9879
,, Name	*Waverley*	*Abbotsford*
Load (axles)	* 34	34
,, (tons tare) ..	*240	240
,, (tons full) ..	*260	255

Distance.		Schedule.	Actual.	Schedule.	Actual.
miles.		min.	m. s.	min.	m. s.
0·0	Carlisle ..	0	0 00	0	0 00
4·4	Harker ..	—	8 19	—	7 49
6·6	Lyneside ..	—	10 40	—	10 02
9·6	Longtown ..	14	14 13	13	13 00
11·6	Scotch Dyke	—	4 28	—	15 14
14·0	Riddings Jc.	7	7 31	—	18 04
16·6	Penton ..	—	6 29	—	22 04
21·1	Kershopefoot	—	12 33	—	27 37
24·2	Newcastleton ..	16	16 16	31	30 56
28·8	Steele Road ..	—	10 30	—	38 37
32·3	Riccarton Jc...	19	18 17	48	46 37
34·5	Whitrope Box	24	22 59	53	51 32
38·4	Shankend ..	—	27 48	—	56 45
41·5	Stobs	—	31 10	—	59 56
45·4	Hawick ..	38	36 58	67	65 35
4·3	Hassendean ..	—	7 35	—	7 23
7·7	Belses ..	—	11 28	—	11 35
12·3	St. Boswells ..	17	16 52	16	16 21
15·6	Melrose ..	6	6 37	—	19 48
19·3	Galashiels ..	6	6 44	24	24 31
3·8	Bowland ..	—	8 47	—	8 05
6·9	Stow	—	13 05	—	12 35
11·0	Fountainhall..	—	18 34	—	18 36
14·4	Heriot ..	—	23 42	—	23 58
15·6	Falahill Box ..	26	25 29	26	25 55
21·5	Gorebridge ..	—	32 14	—	32 22
25·6	Eskbank ..	37	36 41	37	36 53
30·5	Portobello ..	43	42 45	43	42 58
33·5	Edinburgh ..	48	47 17	48	48 06

* 42 axles, 302 tons empty, 330 tons full, from St. Boswells to Edinburgh.

Here the start is made on a rising grade of 1 in 100, and, as previously mentioned, banking assistance was provided to Penton, the 2·6 miles, almost exclusively at this grade, being surmounted in 5 min. 29 sec. from the start, with an attained speed of 34 m.p.h.; at Kershopefoot *Waverley* reached 58½ m.p.h.

A steady ascent was made from Newcastleton to Whitrope, with a recovery in time of exactly a minute; up the unbroken 1 in 75 speed varied between 26½ and 28 m.p.h., with an acceleration to 33 on the final 1 in 90; the usual restrained running followed to Hawick, with no higher maximum than 67 m.p.h., and many brake applications. Over the sharp undulations between Hawick and St. Boswell's the highest speed touched was 61½ m.p.h. It was from Galashiels, however, that the finest effort of the engine was exerted. From the start the line rises at 1 in 120, shortly steepening to 110 for 1½ miles, then 155 for a mile and 99 for a mile to Bowland; yet Bowland station was passed at 38½ m.p.h. Up the 1 in 175 onwards to Stow there was a further acceleration to 45½ m.p.h., and the succeeding ascents at 200 and 150 to Fountainhall did not bring the rate below 44 an hour. From there 2½ miles at 1 in 150 and one at 100 to Heriot reduced the speed to 37½ m.p.h., and the final mile at 132 to 37, which was the rate of breasting Falahill Box. To run the 11·8 miles from Bowland up to Falahill with 330 tons in 16 min. 42 sec., at an average speed of 42·4 m.p.h., I consider a remarkably fine achievement. A cautious descent to Edinburgh concluded the run.

On the 3.46 p.m. train *Abbotsford* had an unchanged 34-axle train throughout, weighing full 255 tons, and the driver was content to stick closely to schedule times. A booking of 31 min. for the 24·2 miles from Carlisle out to Newcastleton leaves nothing to spare, especially as the distance includes a total of 6 miles uphill at 1 in 100, and practically nothing in the way of compensating downhill grades. Speed rose to 65 m.p.h. at Lyneside, was moderated round the Longtown curves, fell to 38 m.p.h. up the continuous 3 miles at 1 in 100 past Riddings, and reached 57½ m.p.h. at Kershopefoot. Above Newcastleton the speed was affected by a driving mist over the exposed stretches of the

Digitized by Google

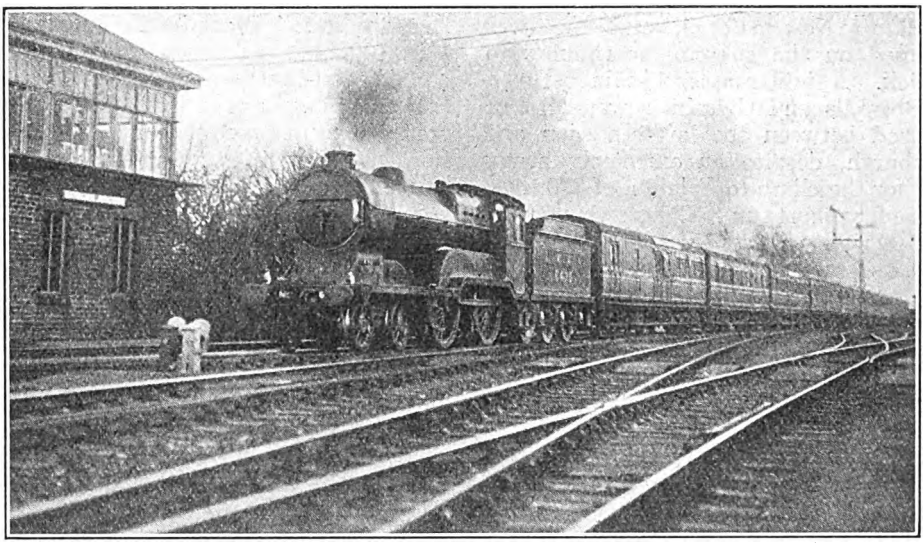


Photo.] [*P. Ransome-Wallis.*

EDINBURGH-GLASGOW EXPRESS PASSING BATHGATE JUNCTION.

4-4-0 No. 6400, *Roderick Dhu.*

line; it fell to 26 m.p.h. at Steele Road, recovered to 29 at Riccarton, and then fell again to 22 at Whitrope Box; such climbing was, however, sufficiently good to economise 1½ min. on booked time from Newcastleton up to Whitrope, and this gain was maintained to Hawick. There was a slight loss of time from Hawick to Galashiels; no higher speed than 60½ m.p.h. was reached over this length. Up to Falahill, the speeds were consistently lower than those of the previous run, apart from the smarter start, which was to be expected with the lighter load; they were 35½ m.p.h. at Bowland, 41½ at Stow, 38½ at Fountainhall, and 37 from Heriot to Falahill, time being just kept from Galashiels to Edinburgh. What always strikes me about the Waverley route is the way in which drivers contrive so exactly to maintain their point-to-point times over gradients of such appalling severity. I have never seen anything to equal it over correspondingly graded tracks elsewhere.

Two further runs over the L.N.E. lines in Scotland, by the North British route between Edinburgh and Glasgow, were timed by a correspondent home on leave from Nigeria. One of the superheated "Scotts" is seen matched against a Great Central "Director," and in this comparison at least the "Director" has the better of it. The former was hauling the 8.50 p.m. Sunday express, with one intermediate stop at Falkirk, and the latter the Glasgow continuation of the down "Flying Scotsman," with what is now a regular stop at Polmont, and a conditional halt at Lenzie which was not made. It will be noticed, by the way, that all the express times over this route have recently been eased out again, west of Falkirk, by a couple of minutes, owing to trouble being experienced with the pitfall at Waterside Junction, between Lenzie and Croy. One cannot help thinking, however, that with the powerful locomotives now available, this increment ought to be unnecessary; in fact, I still adhere to the opinion, often expressed in these columns, that with the perfect grading of the route concerned (apart, of course, from Cowlairs bank) a 60-minute schedule from end-to-end ought to be sufficient to include an intermediate stop, either at Haymarket, Polmont or Falkirk. In view of the vast importance of the two cities connected, indeed, there seems here an ideal venue for a 60-minute service, leaving both termini at the even hours, between Edinburgh and Glasgow.

Digitized by Google

My correspondent does not furnish any intermediate speeds on these runs, but from the times it will be seen that *Ivanhoe*, with 295 tons, lost on both stages, to a total of 2 min., and apparently reached a maximum of 60 m.p.h. only between

L.N.E.R. EDINBURGH-GLASGOW.

Engine 4-4-0 No. ..		9339	6401
,, Name		*Ivanhoe*	*James FitzJames*
Load (axles)		40	44
,, (tons tare)		277	336
,, (tons full)		295	355
miles		m. s.	m. s.
0·0	Edinburgh	0 00	0 00
1·2	Haymarket	3 19	3 13
5·5	Gogar	9 14	9 06
12·0	Winchburgh	17 07	16 20
17·6	Linlithgow	23 28	22 20
19·8	Manuel	25 46	24 21
22·3	Polmont	28 26	27 17
25·5	Falkirk	32 54	6 12
28·9	Bonnybridge.. ..	6 05	10 06
31·8	Castlecary	9 17	13 13
34·4	Dullatur	12 04	16 00
35·9	Cray	13 31	17 28
		p.w.s.	p.w.s.
41·0	Lenzie	20 04	23 21
45·8	Cowlairs	26 12	29 13
			sigs.
47·4	Glasgow	31 02	34 55

L.N.E.R. PERTH-EDINBURGH

Engine: 4-4-2 No. 9903, *Cock o' the North.*
Load, 32 axles: 224 tons tare, 240 tons full.

Distance.		Schedule.	Actual.	Speed.
Miles.		min.	min. sec.	m.p.h.
0·0	Perth ..	0	0 00	—
			sigs.	15
3·5	Bridge of Earn	6	8 55	53½
				27
10·3	Glenfarg ..	19	20 53	31
13·5	Mawcarse Jc.	—	24 41	65½
16·3	Milnathort ..	—	27 16	54
17·3	Kinross Jc. ..	29	29 07	—
3·7	Blairadam ..	—	5 32	62
5·7	Kelty.. ..	10	7 57	*45
8·0	Cowdenbeath	14	11 37	31
10·0	Crossgates ..	—	14 05	53
			p.w.s.	40
13·7	Dunfermline..	21	19 21	—
2·0	Rosyth ..	—	3 37	64
3·5	Inverkeithing	5	5 17	—
5·5	Forth Bridge N.	9	8 59	32½
7·2	Dalmeny ..	12	12 07	41
10·2	Turnhouse ..	—	15 37	60
13·2	Saughton ..	—	18 49	57
15·5	Haymarket ..	22	21 45	—
16·7	Edinburgh ..	25	24 42	—

* Service slack.

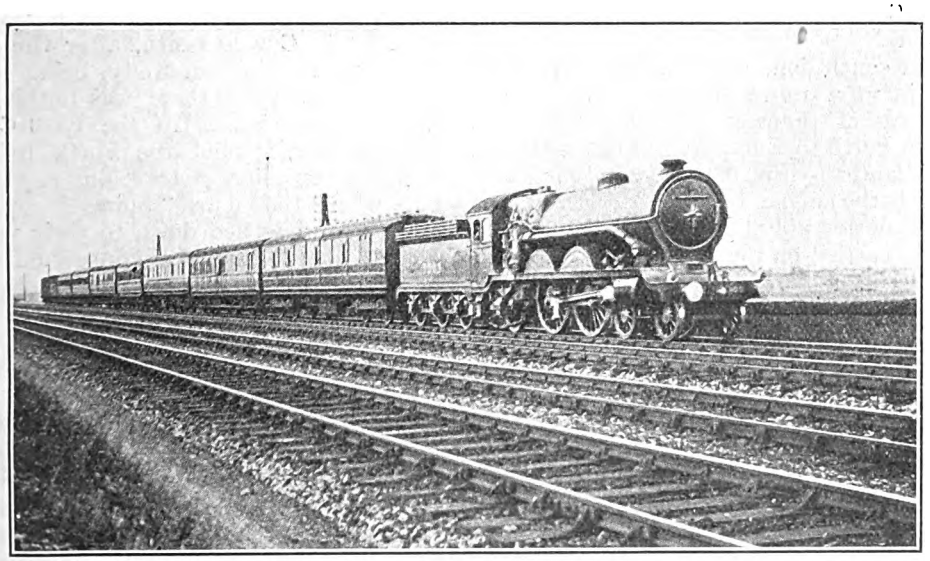


Photo.] [*C. J. L. Romanes.*

PERTH-EDINBURGH EXPRESS NEAR HAYMARKET.

N.B. 4-4-2 Engine No. 9903 *Cock o' the North.*

Digitized by Google

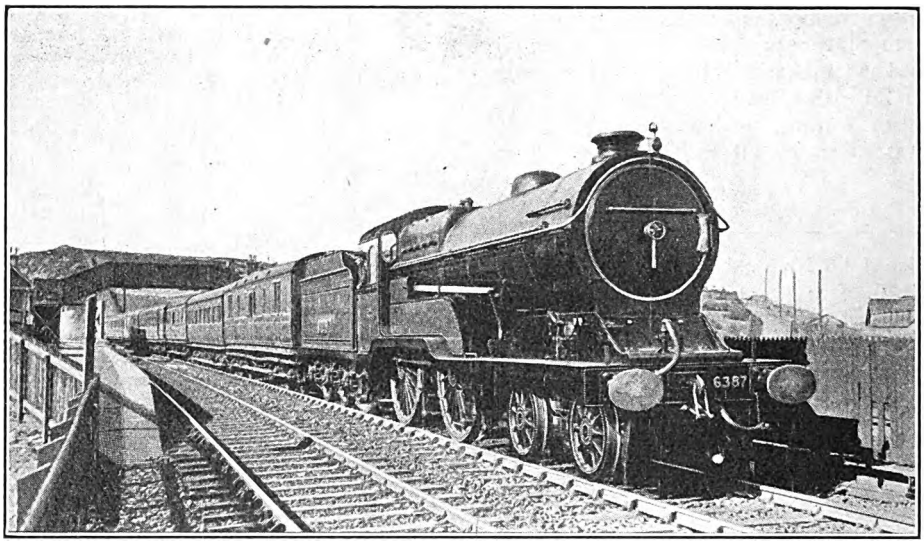


Photo.] [*R. D. Stephen.*

PERTH-EDINBURGH TRAIN AT NORTH QUEENSFERRY.

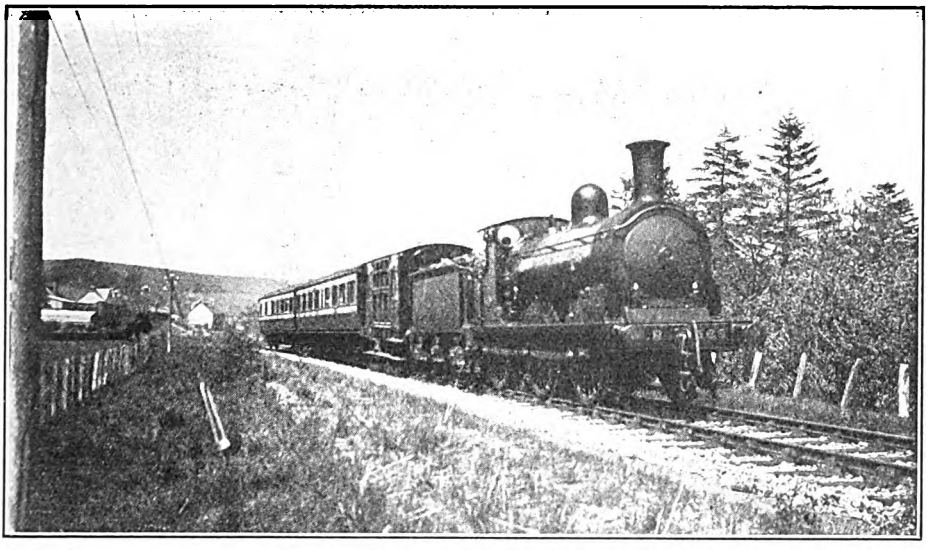
L.N.E.R. 4-4-0 No. 6387 "Lucy Ashton."

Dullatur and Croy, in virtue of a smart start from Falkirk. *James FitzJames*, on the other hand, had a little in reserve on both sections of the journey, and ran from Linlithgow to Manuel at an average of between 65 and 66 m.p.h., exceeding the mile-a-minute rate again between Dullatur and Croy, and this with a very substantial train.

In conclusion, I add a correspondent's timing of a train which figured among my records of January last—the 12.25 p.m. from Perth to Edinburgh. Once again an "Atlantic"—No. 9903, *Cock o' the North*—was the engine, but the load of 240 tons was considerably lighter than the 290-ton train carried on my trip. Between Perth and Hilton Junction a bad signal check was experienced, costing fully 2½ mins., but between there and Bridge of Earn the driver rapidly accelerated to 53½ m.p.h. and then went up the 6½ miles at 1 in 75 to Glenfarg in great style, taking 11 min. 58 sec. between the two stations last-mentioned, as against my 12 min. 15 sec. His subsequent speeds, all of which are indicated in the table, were also higher than mine, so that time was kept to Kinross Junction, representing a net gain of 2½ min. to engine. Onwards to Dunfermline, where the line is infested with speed restrictions and sharp switchback grades, the speeds were very similar to mine, the minimum of 31 m.p.h. up the 1 in 80 to Cowdenbeath, after the customary slack through Kelty, being good. Beyond that point there was nothing of note to mention. Up the East Coast route proper, beyond the Forth Bridge, I had no occasion of travelling last year, but when the new "Shires" are in service, and settled down to their work, I shall hope to have an opportunity of setting on record some of their capabilities over the Scottish Section of the L.N.E.R.

My list of acknowledgments this month is but short; they are due to F. D. Barnby, H. T. L. Champness, L. A. Garrard, C. Macdonald, Lieut.-Col. H. A. Reed, A. Thorpe, and S. C. Vessey for letters received since the last issue.

Digitized by Google



PEEBLES TRAIN LEAVING BROUGHTON.

The Peebles Branch of the L.M.S.R.

By H. C. H. MOLLER.

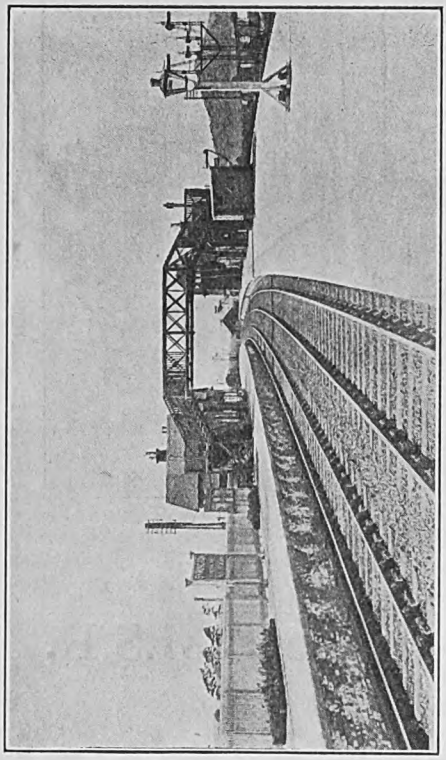
SITUATED on the Tweed amidst some of the finest scenery in the Southern Uplands, Peebles is a well-known Scottish health and holiday resort. The town is old, but has been greatly modernised, though a few of the older buildings still remain. The "Cross Keys" Inn dates from the 17th century, and has a close association with Sir Walter Scott, being the original of the "Cleikum" inn in "St. Ronan's Well." Part of the popularity the town now enjoys is undoubtedly due to the very convenient railway services connecting it with Edinburgh and Glasgow, and a considerable number of residents travel daily to these cities.

The L.N.E.R. line from Edinburgh approaches the town from the north, along the valley of the Eddleston Water, which stream enters the Tweed at Peebles, and after sweeping round the north-eastern side continues eastward down the Tweed Valley to Galashiels, where it joins the main Waverley route. The L.M.S. branch from Symington commences from a station situated on the south bank of the river, and though generally regarded as a terminus, actually has a connecting track joining it to the L.N.E.R. line. Throughout almost its entire length this line runs at a height of over 600 ft. above sea level, and passes through some magnificent scenery.

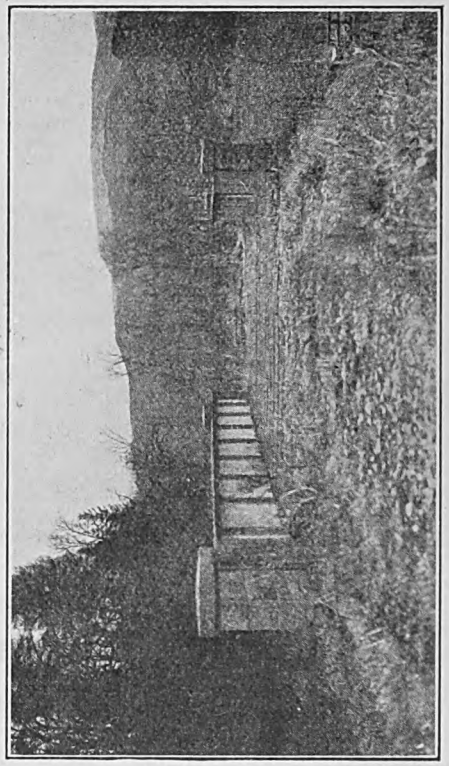
On leaving Peebles the line follows the south bank of the river for some little distance before entering a tunnel about 600 yards long in the shoulder of Cademuir Hill. Emerging from this tunnel the Tweed is crossed by a fine stone-arched viaduct from which a glimpse of Neidpath Castle, built on the crags overlooking the Tweed, is obtained. It was besieged and reduced to its present ruinous condition by Oliver Cromwell during his campaign in Scotland in 1650.

Once on the north bank the railway follows the course of the river closely to Lyne. This station closes at 5 p.m., and after that hour is used as a halt, trains stopping only to pick up or set down passengers on information being given. Three and a half miles farther up the valley Stobo station is reached. As there is no village here the station is named after Stobo Castle, which stands about half a mile to the north, and serves the castle and surrounding farmsteadings.

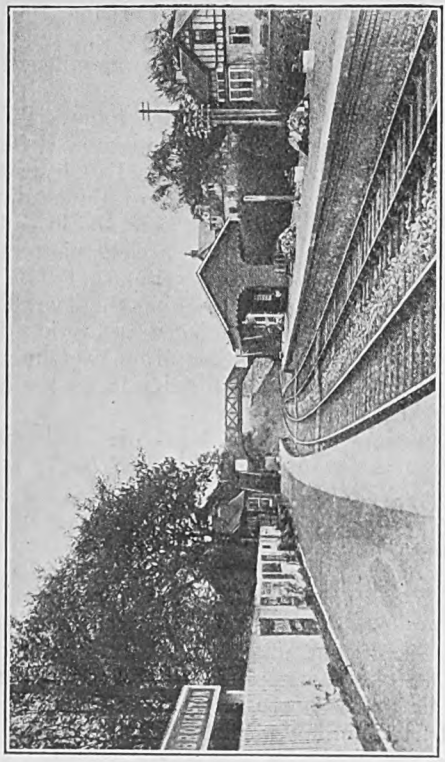
Digitized by Google



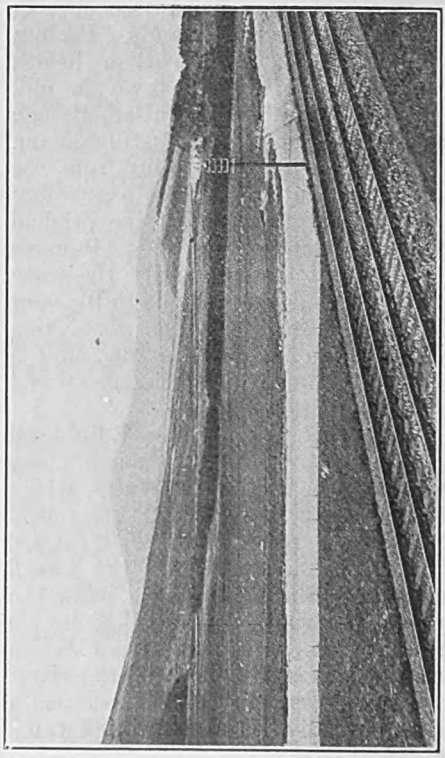
SYMINGTON STATION.



UNDERLINE BRIDGE ON TALLA BRANCH.



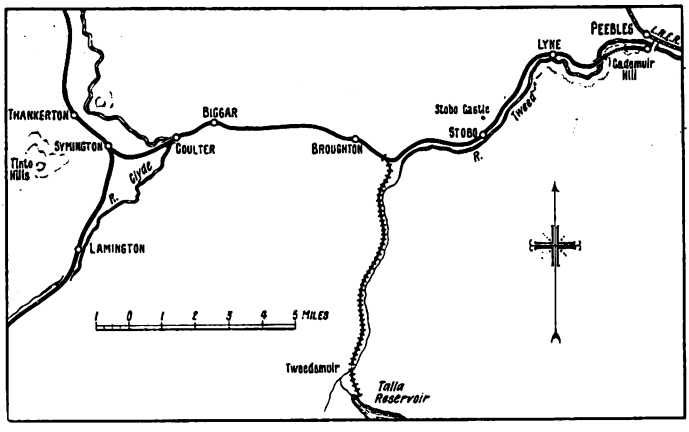
BROUGHTON STATION.



TINTO AND THE CLYDE FROM MAIN LINE.

Digitized by Google

Broughton station, which is next reached after a further 4½ miles, is the largest intermediate station on the line. As well as ample siding accommodation, a passing loop is provided, and in addition the down platform, shown on the right-hand side of the photograph, is an island, so that should it ever be necessary a third line could be laid round it. The station may have been designed in an optimistic moment when a large increase in local traffic was expected from this district, but more probably was enlarged because of the quantities of materials which must have been dealt with here during the construction of the Talla Reservoir.



SKETCH MAP OF PEEBLES BRANCH.

Mention might here be made of the Talla Reservoir Railway, a contractors' line about eight miles long, which commenced at a junction with the Peebles branch about three quarters of a mile east of Broughton station.

Constructed to transport the materials and labour for the building of the Talla

L.M.S. TRAIN SERVICE. SYMINGTON, BIGGAR AND PEEBLES BRANCH, JULY, 1927.

	M.O.			S.O.	S.	S.O.	S.	S.O.	S.	S.*	S.O.	S.O.	W.O.
	a.m.												
Glasgow (Central) ..	6 45	—	10 25	12 45	2 0	2 10	4 30	4 30	4 45	5 30	5 30	9 0	9 30
Edinburgh	6 30	8 55	10 5	12 48	2 0	2 3	4 20	4 20	4 40	5 35	5 45	—	9 20
Carlisle	5*f*21	7 55	9 0	—	1 16	1 16	3*f*20	3*f*20	4 16	4 16	—	7*f*46	8*f*35
Symington leave	8 40	10 37	11 52	2 5	3 10	3 28	5 32	5 40	5 57	6 40	7 11	10 30	10 45
Coulter	8 45	10 45	11 56	2 9	3 14	3 32	5 37	5 45	6 1	6 44	7 15	10 34	10 49
Biggar	8 50	10 50	12 1	2 14	3 18	3 36	5 41	5 49	6 6	6 48	7 19	10 38	10 53
Broughton	8 59	—	12 9	2 22	3 26	3 44	—	5 57	6 14	6 56	7 27	—	—
Stobo	9 9	—	12 17	2 31	3 32	3 52	—	6 6	6 23	7 4	7 36	—	—
Lyne..	9 16	—	12 24	2 38	3 39	3 59	—	6 14	6 32	7 11	7 43	—	—
Peebles arrive	9 24	—	12 32	2 46	3 47	4 7	—	6 22	6 39	7 18	7 50	—	—

				S.O.	S.	S.O.	S.	S.O.	S.	S.O.		
Peebles leave	—	7 45	9 45	1 5	1 25	3 20	4 0	7 5	7 20	8 50	—	—
Lyne..	—	7 51	9 51	1 11	1 31	3 26	4 6	7 11	7 27	8 58	—	—
Stobo	—	7 58	9 58	1 18	1 38	3 33	4 13	7 18	7 33	9 7	—	—
Broughton	—	8 6	10 6	1 27	1 47	3 41	4 21	7 25	7 41	9 19	—	—
Biggar	7 10	8 15	10*b*22	1 36	1 56	4*e*10	4 30	7 39	7 50	9 32	—	—
Coulter	7 20	8 20	10 26	1 41	2 1	4 15	4 35	7 45	7 55	9 38	—	—
Symington	7 24	8 24	10 30	1 45	2 5	4 20	4 40	7 50	8 0	9 43	—	—
Carlisle	—	10 58	12*f*31	3 45	3 45	7 4	7 4	—	12*f* 0	1*c*10	—	—
Edinburgh	9 12	9 33	12 5	3 15	3 15	5 50	5 50	9 23	9 23	11 0	—	—
Glasgow (Central) ..	9 0	9 30	12 5	3 16	3 16	5 50	5 55	9 25	9 20	11 0	—	—

M.O.—Mondays only. W.O.—Wednesdays only. S.O.—Saturdays only.
S.—Saturdays excepted. *f*.—Connections *via* Carstairs.

Digitized by Google

Reservoir, which now supplies Edinburgh, over 32 miles away, it winds up the Tweed Valley to within six miles of its source, climbing to a height of almost 900 ft. On the completion of the reservoir the line was abandoned and afterwards dismantled, but can still be traced throughout its entire distance. Although the right-of-way is overgrown with thick shrubs and in some cases small trees, the bridges and abutments, which are all in position, are in very good condition, and show that the line, although of a temporary nature, was constructed on substantial lines.

On leaving Broughton the line continues to Biggar, 4½ miles farther on, an important little town, which, as its name ("Bygggarhr," the barley field) implies, is the centre of a considerable agricultural area.

Like Peebles, it is becoming increasingly popular as a holiday resort, and has, in addition, a considerable residential population, who travel regularly to Glasgow. It may be of interest to mention that Biggar is the ancestral home of the Gladstone family.

Coulter, the remaining intermediate station, is situated where the line crosses the Clyde, two miles before Symington Junction.

The station consists of a single platform, with waiting room, &c., siding accommodation with a loading bank, and sheep pens being provided. There is no signal-box between Symington and Biggar, the starting signals at Coulter being operated from an open five-lever frame on the station platform.

Crossing the Clyde by a girder viaduct, Symington is shortly reached, and the junction with the main Glasgow-Carlisle line where the Peebles branch shares an island platform with the "up" main line.

The service at present in operation is given in a separate table, and from this it will be seen that trains stop at all stations. On Mondays an extra train leaves Symington at 10.45 a.m. for the convenience of those attending the weekly market. At the time of the writer's visit the line was being worked by two Drummond 0-6-0's, with a Drummond 4-4-0 as spare engine.

L.N.E.R. SUNDAY EXCURSION TRAIN ON "WAVERLEY" ROUTE.

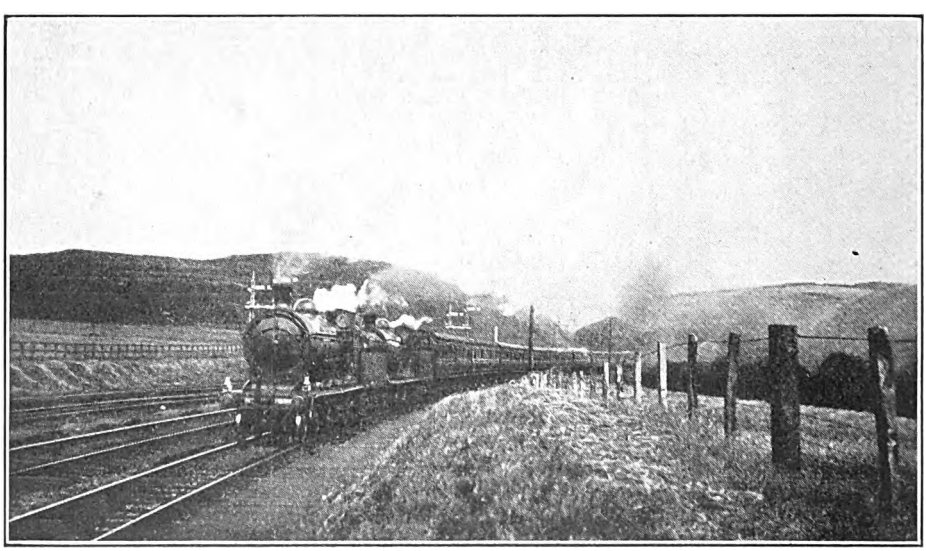


Photo.] DOUBLE-HEADED TRAIN ASCENDING HAWICK BANK. [*R. H. Fett.*

Drawn by two "Scott" Class 4-4-0 engines.

Digitized by Google

CIRCULATING AREA AT ELGIN, L.N.E.R. STATION.

The "Furthest North" Sections of the L.N.E.R.

By "INDICATOR."

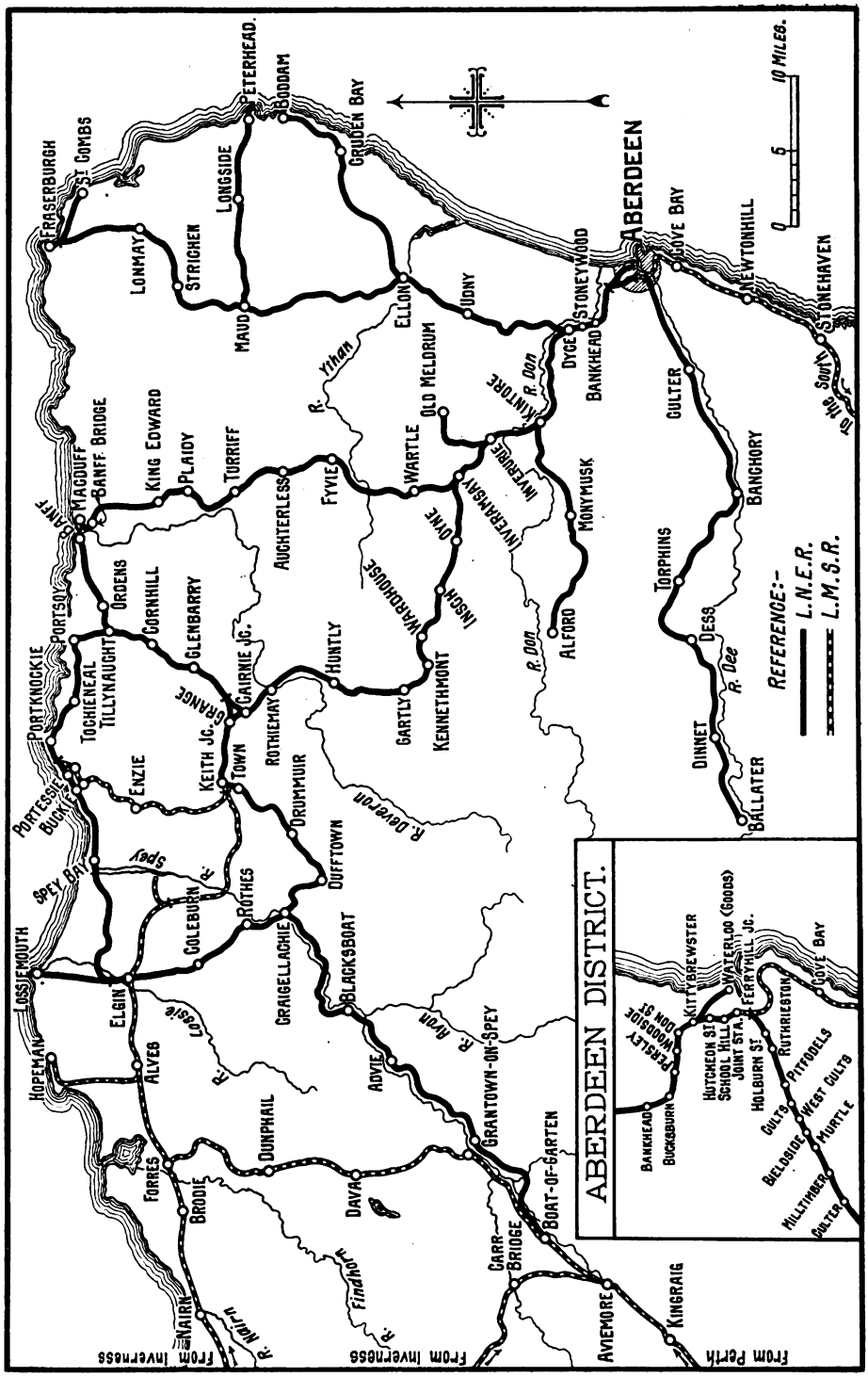
(*Photos by J. F. Gairns, except as noted.*)

"SLEEPING-CAR, London (King's Cross) to Aberdeen, Elgin and Lossiemouth." This announcement, which appears in the L.N.E.R. summer time-tables in reference to the 7.40 p.m. sleeping-car express—*The Aberdonian*—from London, may not seem to be so striking as it really is, until one finds that Lossiemouth is no less than 608½ miles away, and that not only Elgin and Lossiemouth, but also a number of other places on the route, lie further north than Inverness, besides being more distant from London. There are, of course, other lines in Scotland which go still further north, particularly the Highland section beyond Inverness of the L.M.S.R., but so far as standard through services are concerned, and unless vehicles are worked beyond the usual terminal points, as sometimes occurs, the King's Cross-Lossiemouth sleeping-car can claim to be the longest through service from London in operation.

The 7.40 p.m. from King's Cross, now known as *The Aberdonian*, calls at Grantham, York (where the Penzance-Aberdeen coaches are attached), Newcastle, Edinburgh (Waverley), Dundee, Arbroath, Montrose and Stonehaven to Aberdeen, due 7.20 a.m. It has a dining-car from King's Cross to York, and at Aberdeen a breakfast-car is attached. Leaving the Aberdeen Joint Station at 7.45 a.m., with through carriages to Inverness, to which place the breakfast-car works through, it takes the inland route to Elgin *via* Craigellachie, calling at Huntly, Keith Town, Drummuir (conditionally), Dufftown, Craigellachie and Rothes to Elgin, reached at 9.56 a.m., leaving again at 10.8 a.m., and reaching Lossiemouth at 10.20 a.m.

A rather slower train leaves Aberdeen immediately behind it at 8.5 a.m., with sections for Elgin and Lossiemouth by the same route and by the coast route, which is 7½ miles longer, so that stations not

Digitized by Google



MAP SHOWING GREAT NORTH OF SCOTLAND SECTION (NORTHERN SCOTLAND AREA) L.N.E.R.

Digitized by Google

served by the main train can be reached by changing passengers.

The return train leaves Lossiemouth at 4.5 p.m., Elgin at 4.30 p.m., *via* the inland route, and on a slightly altered schedule reaches Aberdeen at 7.4 p.m. A section in advance leaves Elgin at 3.25 p.m. by the longer coast route, joining up at Keith Junction. Aberdeen is left at 7.35 p.m. and London is reached at 7.30 a.m., there being restaurant-car facilities from Elgin to Edinburgh.

Apart, however, from the fact that this is the longest standard through service from London on any British railway, the route followed is a distinctly interesting one, and in view of the fact that the Great North of Scotland Section (Northern Scottish Area) of the L.N.E.R. is still not so well known to southerners as it should be, it is thought that some descriptive particulars and comments on this "Furthest North" section of the L.N.E.R. will be in place. The subject has, however, received attention in these pages on a number of other occasions, though usually on a more general basis, or in regard to a particular phase of traffic and operation, so that it is now proposed only to consider the alternative main lines from Aberdeen to Elgin, with the Lossiemouth branch, and to include the little-known, though interesting, Banff Harbour and Macduff branches, in that they give access to a stretch of Scottish coast which is otherwise served by the "coast" line between Portsoy and Lossiemouth.

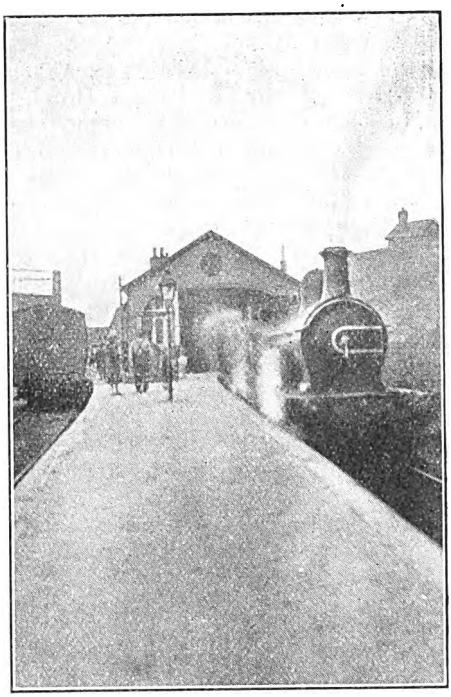
The Joint station at Aberdeen was very fully described in the January, 1921, number, so that it will be sufficient to recall that this fine station has four through-platform lines, used of necessity by the trains conveying vehicles running both north and south of Aberdeen, five terminal platforms at the south end and four at the north. It is located in the valley of the Denburn, and is spanned by two road bridges. The lower—Guild Street—provides access to the station from the City proper, though the main entrance and booking-hall are on the side towards the Harbour. The offices of the Northern Scottish Area are located in a handsome building on Guild Street, this being the headquarters of the late Great North of Scotland Railway. Nearby is the L.N.E.R. Station Hotel. The other bridge, a fine granite arch of 130 ft. span, is much higher and carries Union Street, the main thoroughfare in Aberdeen. Alongside this is the L.N.E.R. Palace Hotel, the leading hotel in Aberdeen, which has a covered way and lift connection direct into the station, though its front entrance is on Union Street, at the end of the bridge.

The northern platforms at the station extend nearly under the Union Street arch, with Union Terrace Gardens on the slopes of the valley on one side. A short distance further along another fine viaduct is approached, the Rosemount, a centre not only for L.N.E.R. motor-omnibus services but also for many other local facilities. Under this arch are the ends of the two platforms of Schoolhill station, these so nearly approaching those at the north end of the Joint station that a train of exceptional length can be in both stations at the same time. Actually Schoolhill, which is reached from Rosemount Viaduct, is mainly a ticket-collecting platform for trains approaching Aberdeen from the north, but it is convenient also for season-ticket passengers by local trains who are engaged in the immediate vicinity.

A feature of the location is that not only are the bridges and viaducts mentioned and ordinary buildings in the vicinity mainly of Aberdeen granite, but there are quite a number of public and other buildings, churches, &c., in view, so that the visitor here obtains a very good idea as to what Aberdeen has to offer in the way of notable architecture, all executed in the characteristic material which has caused it to be known as "The Granite City."

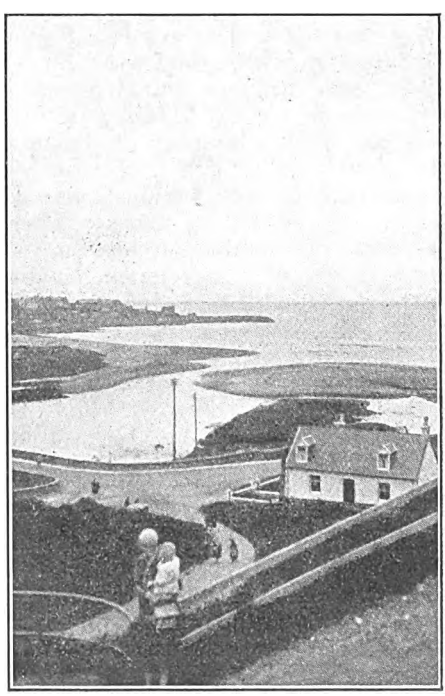
Leaving the Joint station, and passing between the platforms at Schoolhill, a short tunnel is traversed, and then another, before Hutcheon Street station is reached. Then comes Kittybrewster, a busy centre for live-stock traffic, with engine sheds and carriage sidings, though since the new railway workshops at Inverurie have been in use (about 25 years), the shops at Kittybrewster have been used only for repairs for the engineering department, and for the maintenance of railway motor road vehicles. Then follows a succession of local stations, so unusual in character that it will be of interest to

Digitized by Google

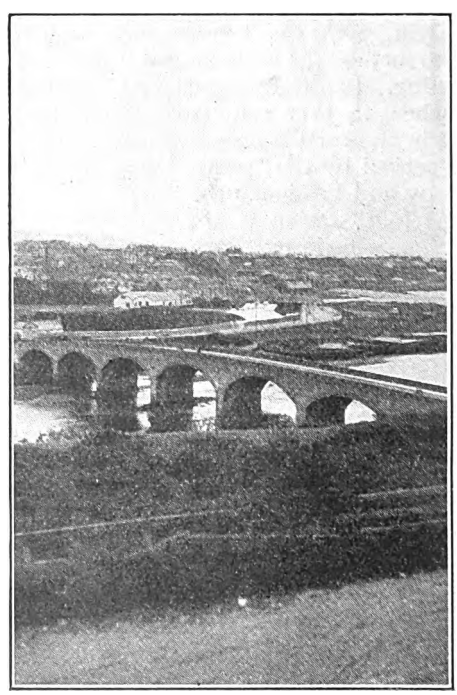


BANFF HARBOUR STATION.

BANFF BRIDGE STATION.



VIEW FROM BANFF BRIDGE STATION.



THE FAMOUS BRIDGE AT BANFF.

Digitized by Google

give their distances and names as far as Dyce.

	M.	Ch.
Aberdeen (Joint).. ..	—	—
Schoolhill..	—	30
Hutcheon Street..	—	67
Kittybrewster	1	29
Don Street	2	15
Woodside..	2	44
Persley Halt	3	15
Bucksburn	4	5
Bankhead..	4	44
Stoneywood	5	9
Dyce	6	18

Between these stations there is an interesting local service of trains, while many of those proceeding further call at one or more of the stations, so that there is, in the aggregate, a generous train service. There is not much, otherwise, to be said about this section, which is covered in about 10 minutes by the non-stopping trains, except that from Don Street onwards, though factories, mills, &c., are occasionally in view, the country becomes more or less open and there are picturesque views of the River Don here and there.

Dyce is the junction for the Buchan section to Ellon (branch to Cruden Bay and Boddam) and Maud Junction (divide to Fraserburgh and St. Combs and to Peterhead). There are four platform lines, those for the Buchan section diverging directly away at the station. In the angle between are permanent-way stores. By this time the train is traversing more or less picturesque pastoral country through the valley of the Don, but there is not much of special interest through Pitmedden and Kinaldie, except that the River Don is generally followed and is frequently quite close to the line. Near Kinaldie the Black Burn joins the Don. This includes some low-lying "haughs" which are sometimes under water when the river is in flood.

Kintore, which serves "an ancient place, with a quaint town hall," is the junction for the Alford branch, a picturesque line down the valley of the Don which is much visited by tourists and which is included in some of the road and rail tours in operation in this part of Scotland. The station has only the usual two platforms, and the branch diverges to the left just beyond it. From Kintore the main line turns north to Inverurie, "a pleasant little town in a fine agricultural district," passing a siding at Port Elphinstone and crossing the Don as it turns westward, a short distance beyond. The Ury continues, however, to provide river companionship for some miles further. Where the Don and the Ury meet there is a conical, flat-topped mound called the "Bass of Inverury," supposed to have been the site of an ancient castle.

Inverurie has grown to be a fairly big town since the railway workshops were transferred there, some 25 years ago. It has one down platform, a middle line, up platform and bay line for the use of the Old Meldrum branch trains. Beyond the station are the railway workshops and sidings, and then the Old Meldrum branch leaves as a single line, more or less alongside, until it turns away across the River Ury. On the way to Inveramsay, a run of 3¾ miles, the range which carries the six peaks of Benachie (highest 1,733 ft.) comes into view, as by this time the country has become characteristically hilly, though generally pastoral in the immediate vicinity of the line. The River Ury is a close companion on this stage and is twice crossed.

Inveramsay is the junction for the Macduff line, to be considered later. It has one down platform and an angular platform on the up side, the outer face of which accommodates the branch trains, though some are through and most include through vehicles. Beyond the station the branch continues almost directly north, while the main line turns west. The branch crosses the River Ury by an arch bridge. The main line continues through Pitcaple, Oyne and Insch, through one of the old territorial divisions of Aberdeenshire known as the Garioch. Near Pitcaple the woods enclosing Logie House may be noted. Near Insch are the Culsalmond and Foudland Hills and the Hills of Tillymorgan, Dunnideer and Christ's Kirk.

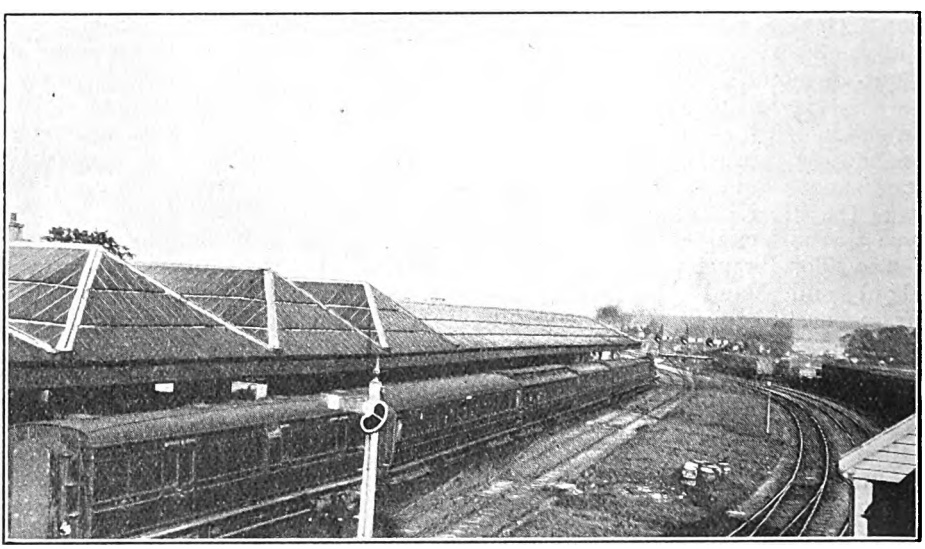
Getting further among the hills and past Wardhouse and Kennethmont stations, and leaving the Garioch for Strathbogie, Gartly is reached, near which is a mountain of 1,851 ft., known as Tap o' Noth. Five miles further on is Huntly, the largest inland town in Aberdeenshire, 41 miles from Aberdeen. Here even the most important expresses call. It stands in the centre of an extensive agricultural district, and may be called the capital

Digitized by Google

of the old territorial division of Strathbogie. It is pleasantly situated at the confluence of the Deveron and the Bogie. Near by are the ruins of Huntly Castle. Railway motor omnibuses run thence to Aberchirder. The station has only the usual two platforms, but has an all-over roof. Both before reaching and beyond the station there are some picturesque views, particularly where the river is crossed twice.

Onwards to Rothiemay the River Deveron is a close companion, and at the place where it is crossed, near the station, an old single-line railway viaduct alongside that now used may be noted. Nearly three miles further on is Cairnie Junction. This is not a public station, in that it is used only for exchange purposes, while some of the Elgin trains which have sections by both routes divide or combine here. There is a single island platform with outside running round lines besides those serving the platform faces. The station is really one apex of a triangle. The two routes diverge, each double track, one to Grange station and the other to Grange North Junction. Between these there is a single line, so that trains for the Coast line can run to Grange and thence to Keith (some trains divide or separate in this way instead of at Cairnie). The whole location is interesting, especially as trains are dealt with in different ways by various services.

Following the inland route first, and passing Grange, after a run of four miles, including picturesque views over the River Isla, Keith ticket platform is reached, the Great North section being one where ticket collection and examination, before reaching principal stations, is still a general practice. On the left are the engine sheds and the peculiar and distinctly-antiquated station known as Keith is reached, where the double line terminates. Part of this, used by L.M.S. Highland section trains, is covered, with two through lines, but Great North trains in both directions *via* Craigellachie, use one outer platform operated as a single line. The station has, though antiquated in type, refreshment and dining rooms and other modern conveniences.

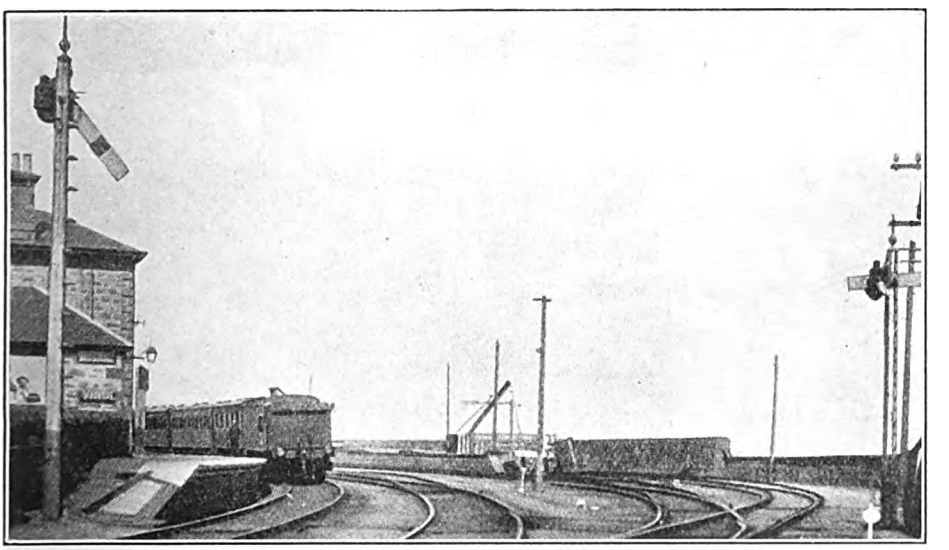


INVERNESS-ABERDEEN RESTAURANT-CAR EXPRESS AT ELGIN, L.N.E.R. STATION.

From this station Great North trains continue on single line between picturesque gardens to Keith Town station. Keith is an important business centre of Banffshire, and is therefore the scene of considerable traffic. At the point where the line crosses the river an old and picturesque road bridge alongside may be noted. On the way to Auchindachy (now all single line except at crossing stations) scenery becomes very fine, and there is usually a river or stream in view.

Digitized by Google

A distillery siding is passed on the way. Between Auchindachy and Drummuir may be noted a platform for use of workers at one of the distilleries passed. Beyond Drummuir the line follows the shoes of Loch Park, which, with its islands and the dense woods on the opposite side, renders this a very pleasant stretch. Further on, Dufftown is reached, beautifully situated in the valley of the Fiddich, a tributary of the Spey. It has no fewer than seven large distilleries. Near the station a glimpse is had of the ruins of Balvenie Castle. Some wonderful views are had of the hills and valleys as the line curves round to Dufftown and beyond.



LOSSIEMOUTH-ELGIN TRAIN AT LOSSIEMOUTH.

Continuing, with a picturesque river as company, and with patches of broken water, and here and there a rock cutting, and with Ben Rinnes (2,755 ft.) in view, Craigellachie is reached, one of the loveliest places in this picturesque part of Scotland. This is the junction for the beautiful Spey-side line to Grantown-on-Spey and Boat of Garten. The station is peculiar, as it has a double line through the main part and a single outside platform curving away for branch trains, the road passing over so that no more is seen of the branch. The town is on a slight eminence overlooking the Spey, where it joins the Fiddich. The river makes a grand sweep round the base of Ben Aigan (1,544 ft.), and is crossed by a Telford iron bridge, with embattled towers, close to which is the rock known as Craigellachie.

On single line again, and now in company with the River Spey, one of Scotland's greatest rivers, the crossing involving bridges over two arms of the river, the run continues to Dandaleith and thence to Rothes, the Spey being in places quite close and with wide picturesque reaches. The Spey now turns north, while we continue north-west along the Rothes Glen, with a branch of the River Lossie as company. This is a very pretty section, as in places the river falls in steps, and the scenery is diversified by stretches of heath and moor and scarred hill-slopes. Four and a quarter miles beyond Rothes is Coleburn crossing (no platforms). Longmorn station is then reached (tickets checked), and after crossing the Highland line from Keith we curve round to join the coast-line at Elgin East Junction, where a short run carries us past the engine sheds and goods yards to Elgin station.

Elgin, the county town of Moray, is a busy place of considerable size, possessing much of scenic and tourist interest, besides accommodating the ruins of Elgin Cathedral, a special attraction to visitors. It is well sheltered by surrounding hills, and is in great favour as a residential

Digitized by Google

district. It has quite a number of notable buildings and other places of interest. The station, too, is a fine erection, with neatly-designed booking hall and premises, dining and refreshment rooms, &c., and with wide platforms, which, with the circulating area, are almost entirely covered by glazed roofing. There is also a long platform used by through trains which is continued under the road bridge to connect with the Highland station beyond, there being a considerable interchange of passengers, while many of the trains are through or include through vehicles for transfer between the two stations. The Highland line for Keith passes under the road bridge by a separate arch, so that it is diverging away when it passes the Great North station. The latter has also three terminal bay lines for use by trains not involving through communication with the Highland line.

The Lossiemouth branch is used by the Coast line as far as Lossie Junction, 1¼ miles, though it is single track after the outskirts of Elgin are passed. The River Lossie is crossed just before the junction (not adapted for crossing trains) is reached. The branch is not particularly interesting in its early stages, though it crosses a stretch of sandy heath. A brickworks' siding may be noted. There are no intermediate stations, but there is a rifle-range halt 3¾ miles from Elgin. Approaching Lossiemouth, the line comes in alongside the river which gives its name to the place. The station, which serves more particularly Seatown, with Branderburgh a little further west, has only a single platform, but the lines continue beyond into the harbour, Lossiemouth being an important fishing centre. The railway lies at the foot of high ground on which the modern town is situated. The town is in considerable favour residentially, is a great golfing centre, and the harbour deals with a large fishing traffic. On the seaward side there are wonderful stretches of white sand, though the river itself, which can be crossed by a footbridge and by a road bridge, shows some beautiful colour effects as vari-coloured sand is seen through its clear waters.

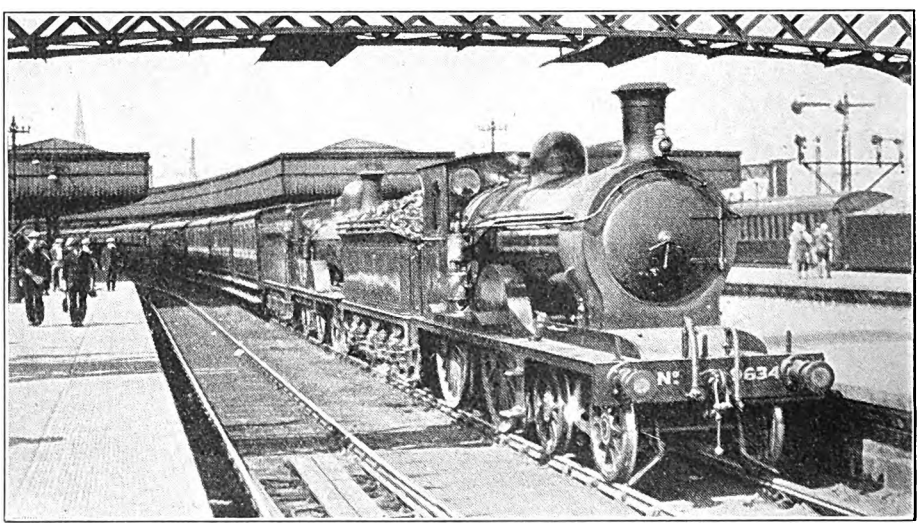


Photo.] **ELGIN-ABERDEEN TRAIN AT ABERDEEN.** [*H. Gordon Tidey.*

N.B. 4-4-0 No. 9634 and G.N.S. 4-4-0 No. 6893.

Returning from Elgin by the coast line, the River Lossie is again crossed before reaching the first station, Calcots (ruins of Spynie Palace in sight), and, traversing a sandy stretch, another 2½ miles brings us to Urquhart. Next comes Garmouth, a quaint old-fashioned town at the mouth of the Spey. This is a fairly-important place, as it brings us to the coast, but as it is only a short run to the next station, it has one platform only, with sidings, and is

Digitized by Google

not adapted for crossing trains. A little beyond is the great Spey viaduct, with seven spans and about 950 ft. in length. It is single line.

Beyond this is Spey Bay station, serving a modern holiday resort. By this time the line is approaching the sea fairly closely and continues to do so for many miles. Portgordon is a non-crossing station. Approaching Buckpool the railway overlooks the village and harbour, and as this place almost joins on to the busy fishing port of Buckie, a mile further on, the impression one obtains, as he looks seawards over these places, is distinctly interesting. Buckie has a fine harbour, which accommodates hundreds of fishing craft and sends thousands of tons of fish southwards during the season. The massive protection walls, however, afford evidences of the forces which have to be withstood during winter gales. Buckie has quite extensive sidings and tracks which proceed into the harbour. It is also a sea-bathing and holiday resort. Through the town flows the Buckie Burn.

Beyond Buckie station the Highland branch from Keith comes in, though that line is now used only for goods traffic. The branch sidings terminate alongside the L.N.E.R. lines, with which connection is made. Passing Portessie, now within the boundary of the burgh of Buckie, and approaching Findochty, a non-crossing station (all of this series of stations are fairly close together), one looks down on the village as it lies on each side of a small bay. Approaching Portknockie, with a picturesque harbour, there are fine views over a rocky coast, and this applies during the next two miles to Cullen. On this stage the line is high up on the hillside, with views over the rock-bound coast, and with some interesting embankment and viaduct works, notably the great viaduct by which the line curves round into Cullen, a substantial little town, in a break in the high cliffs of this coast, with good sands and other attractions. It has, of course, its harbour, while not far away is Cullen House. The sea is now left temporarily, through Tochieneal, but approaching Glassaugh it comes into sight again. Portsoy is still another fishing town of considerable importance. It takes its name from Loch Soy, near the station, and from the fact that it is at the mouth of the Soy Burn, running from the Loch. Portsoy marble is obtained locally, while the place is an attractive holiday resort on a quiet scale.

From Portsoy the line turns southward

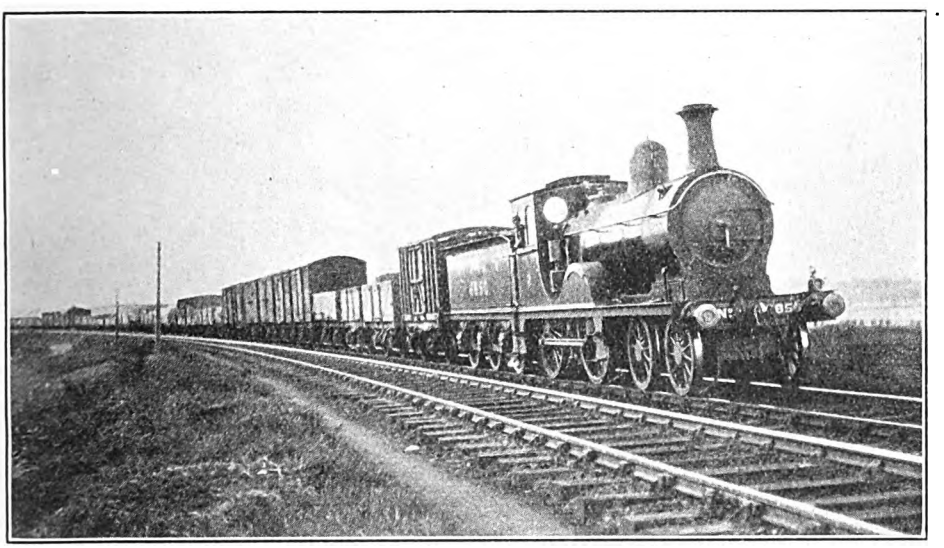


Photo.] UP GOODS TRAIN NEAR ABERDEEN. [*P. Ransome-Wallis.*

G.N.S. 4-4-0 No. 6850 *Hatton Castle.*

Digitized by Google

and inland for good, to Tillynaught Junction. This is the junction for the Banff Harbour branch, and, like so many similar stations, has the usual single down platform and double-sided up platform, the outer face of which accommodates branch trains. The branch is 6 miles in length, and has one intermediate station, Ladysbridge. There are, however, halts at Ordens, Bridgefoot, and for the Golf Club House near Banff. The concluding stage gives a good coast view as the line runs down close to the waterside, while the somewhat constricted harbour is located right on a neck of land at the western mouth of the River Deveron. Most of the town is on this side of the river, but opposite is Macduff, and for some parts of the town of Banff, a favourite holiday, fishing and golfing centre, it is rather more convenient to use Banff Bridge station, on the Macduff line, which is on the other side of the river opposite the famous bridge from which the station takes its name. Goods traffic, as well as a good part of the passenger traffic, is, however, dealt with at the Harbour station, so that the Tillynaught-Banff Harbour branch ranks as the principal route for Banff.

Returning to Tillynaught Junction there is nothing much calling for comment on the 9½ miles to Grange North Junction, with intermediate stations at Cornhill and Glenbarry and Knock, so that attention may now be given to the Macduff line from Inveramsay.

Leaving Inveramsay station, the branch traverses through most of its length typical Aberdeenshire pastoral country, with many picturesque sections but few of outstanding scenic interest. At Fyvie the Little Water comes in, and the woods enclosing Fyvie Castle, with the river, continue to give some pretty views. Continuing in company with the Little Water, and later with the River Ythan, the line continues through Auchterless (the square keep of Towie Barclay Castle may be noted near the station) to the fair-sized town of Turriff. A little beyond, the Water of Turriff joins the Deveron; but though not far distant, little more is seen of the latter river until Banff Bridge is reached. The branch continues its somewhat lengthy mileage through Plaidy and King Edward (said to be a corruption of Kinnedar or Kin Edart), and five miles beyond the latter curves round, high up on the hillside, to the neat little one-platform station known as Banff Bridge.

As already explained, the major part of

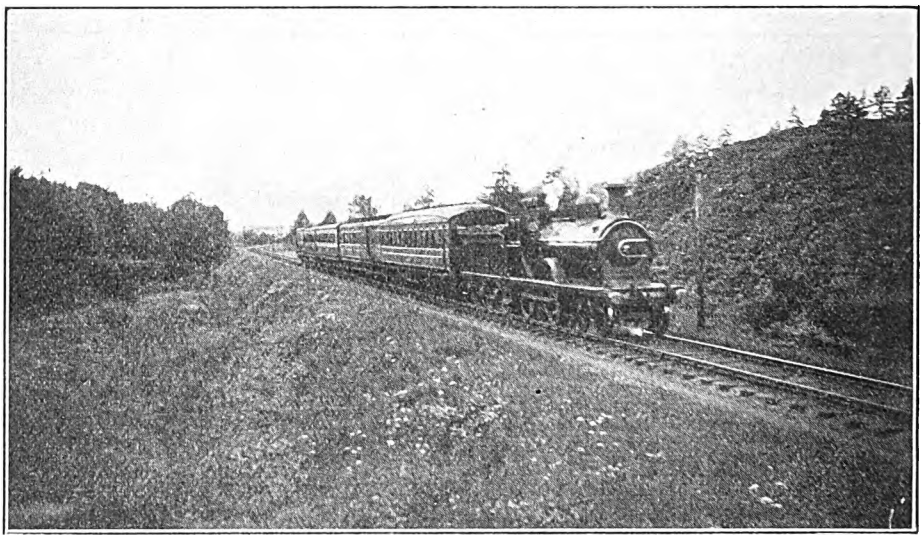


Photo.] [*W. Watt.*

ELGIN-ABERDEEN EXPRESS, WITH THROUGH SLEEPING-CAR TO KING'S CROSS, NEAR LONGMORN.

G.N.S. 4-4-0 No. 6852.

Digitized by Google

the town of Banff is on the opposite side of the Deveron, but Banff Bridge station is immediately opposite the famous bridge of seven arches, and omnibuses run between the station and the town. This route is, therefore, quite a good one, especially as it is sometimes possible to travel to Banff Bridge when there is no service to Banff Harbour, or *vice versa*, so that the result is a combination of services spread fairly equably throughout the day. As Banff Bridge station is on the hillside it is approached by a zigzagging carriage road, with steps for passengers on foot. Banff is a fairly big town, enclosing a ruined castle, and is a centre for many activities. It is also a favourite resort for anglers and golfers, and is growing in popularity with holiday-makers and tourists generally.

Although a good part of the work of the branch is finished when Banff Bridge is reached, the line continues for a further 36 chains round the headland to serve the town of Macduff, a busy fishing centre with a good harbour. On the final stretch of line the passenger has interesting views over the mouth of the Deveron, here fairly wide, of Banff and its harbour beyond, and of the rocky coast round the headland. The terminus is a covered station with one platform and adjoining goods yard, engine shed and carriage sidings. A sloping road gives access to the town of Macduff and its harbour.

The train services on the lines considered include a number of interesting features, and a few remarks in regard thereto will be in order, on the basis of those operating during last summer. On the main line the first is the 4.35 a.m., running in connection with long-distance trains from the south to Aberdeen. This runs to Keith, due 6.23 a.m., calling at the more important stations only, and has through carriages to Inverness, continuing *via* Keith over the Highland route. It connects with the 6.50 a.m. from Keith to Elgin, *via* Grange and the Coast Line, and the 7.10 a.m. to Elgin direct. During the summer months the 7.3 a.m. from Aberdeen is replaced by the 6.30 a.m. stopping train to Keith, and the 7.3 a.m. to Inverurie. Next comes a special summer express, after the arrival of sleeping-car trains from the south, leaving Aberdeen at 7.45 a.m., and calling only, regularly, at Huntly, Keith Town, Dufftown, Craigellachie and Rothes, and due at Elgin at 9.56 a.m. This takes the Lossiemouth sleeping-car, and has a restaurant car and through carriages for Inverness. Behind this is the 8.5 a.m. ordinary express for Elgin, which divides into sections for the Craigellachie and coast routes at Cairnie

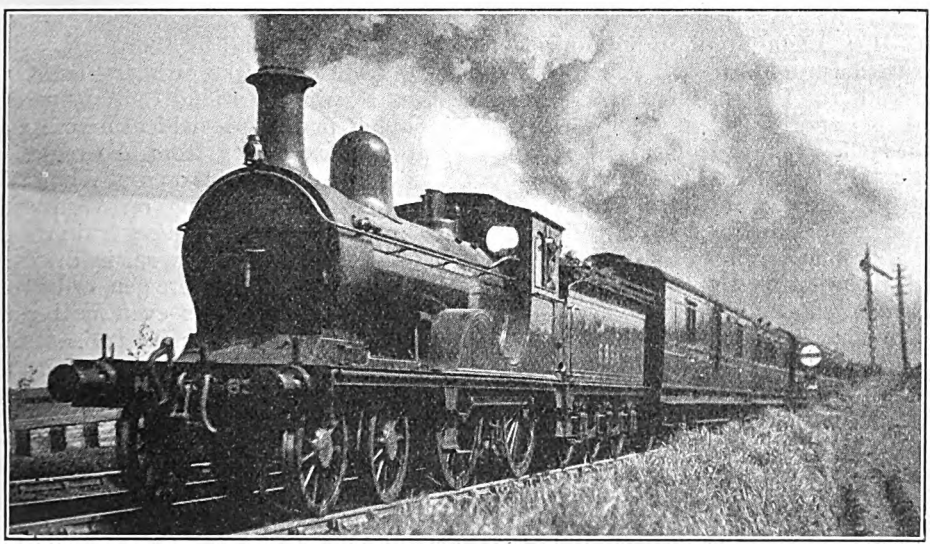


Photo.] **ABERDEEN-ELGIN TRAIN NEAR KITTYBREWSTER.** [*P. Ransome-Wallis.*

G.N.S. 4-4-0 No. 6834.

Digitized by Google

Junction. The coast section is combined at Cairnie with the 9 a.m. from Keith. The Craigellachie section of this train has the restaurant car and through coaches from Aberdeen to Inverness. The 9.45 a.m. from Aberdeen is a semi-fast for Elgin by both routes, dividing at Cairnie Junction, and has through carriages for Inverness *via* the Highland route from Keith. Behind it is the 9.52 a.m. for Macduff.

Except for the 1.15 p.m. from Keith (Keith Town on Wednesdays and Saturdays), *via* Grange, to Elgin by the coast line, there is nothing more until the 1.20 p.m. from Aberdeen to Macduff and the 2.20 p.m. express to Elgin, *via* Craigellachie. This train includes through carriages for Elgin from Edinburgh, and restaurant car and through carriages from Aberdeen to Inverness. At 3.30 p.m. there is another train for Elgin *via* Craigellachie, which connects at Grange with a train from Keith to Elgin *via* the coast. Then comes the 3.45 p.m. for Inveramsay and Macduff, and at 5.45 p.m. a stopping train to Cairnie Junction, which picks up for the 6.45 p.m. express, the two trains combining at Cairnie Junction to form sections for Keith and for Elgin *via* the coast line. The day is completed by the 6.52 p.m. for Macduff, with, on Wednesdays, the 9.40 p.m. for Inverurie, and, on Saturdays, the 9.5 p.m. for Insch and the 10.50 p.m. for Inverurie.

In the opposite direction the trains are: 6.20 a.m. from Keith to Aberdeen; 6.10 a.m. from Elgin *via* the coast to Keith, and 6.40 a.m. *via* Craigellachie, interchanging at Grange; 8.40 a.m. from Keith to Aberdeen; 9.32 a.m. express from Elgin *via* the coast and 9.35 a.m. *via* Craigellachie, combining at Cairnie Junction (these include a restaurant car and through carriages from Inverness to Aberdeen, and through carriages from Elgin to Edinburgh *via* coast section); 12.15 p.m. from Elgin *via* the coast to Keith; 1.3 p.m. from Keith to Aberdeen, with through carriages from Inverness *via* the Highland route to Keith; 2.20 .p.m. from Elgin *via* Craigellachie and 2.25 p.m. *via* the coast, combining at Cairnie Junction, with restaurant car and through carriages from Inverness; 3.25 p.m. from Elgin to Keith *via* the coast; 4.30 p.m. from Elgin *via* Craigellachie (with sleeping car for King's Cross from Lossiemouth and through carriages from Inverness to Aberdeen *via* Highland route to Keith); 5.50 p.m. from Elgin via Craigellachie; 5.55 p.m. from Elgin to Keith *via* the coast, and the 7.35 p.m. express from Elgin *via* the coast to Aberdeen, with through carriages from Inverness. There are, of course, a few more or less local trains between Inveramsay, Inverurie and Kintore to Aberdeen. The Banff Harbour branch has seven passenger and three mixed trains each way in connection with coast line trains, while the Macduff branch has five trains each way, in connection with main-line trains at Inveramsay (generally with through coaches), or working independently from and to Aberdeen.

In addition to the ordinary trains, the Great North of Scotland Railway, prior to grouping, made a special feature of express half-day excursions from Aberdeen and other stations to places on routes described, these generally running on Wednesdays and Saturdays. For these trains exceptionally cheap fares were in operation. Moreover, the trains were generally run as expresses on schedules even better than those given in the ordinary train services, owing to the fact that there was no need to consider the requirements of certain intermediate stations at which the expresses usually call.

Similar express excursions were run after the war, and have been continued under the L.N.E.R. One of these is designed more particularly for the Speyside line, following the Craigellachie route to Elgin as far as that station. It leaves on Wednesdays and Saturdays during the summer at 1 p.m., and makes its first booked stop at Dufftown, 64 miles, booked in 84 minutes. This includes a stop at Auchindachy, if required, to cross another train, the route being single-track beyond Keith. If need be, a relief train follows from Aberdeen at 1.5 p.m., with a corresponding booking. The up train leaves Boat of Garten at 8 p.m., and runs non-stop from Dufftown to Kittybrewster. When the relief train is run, one section starts from Grantown-on-Spey at 8.10 p.m., and runs non-stop to Kittybrewster, while the second part leaves Boat of Garten at 8.12 p.m., its non-stop run being from Dufftown to Kittybrewster.

Digitized by Google

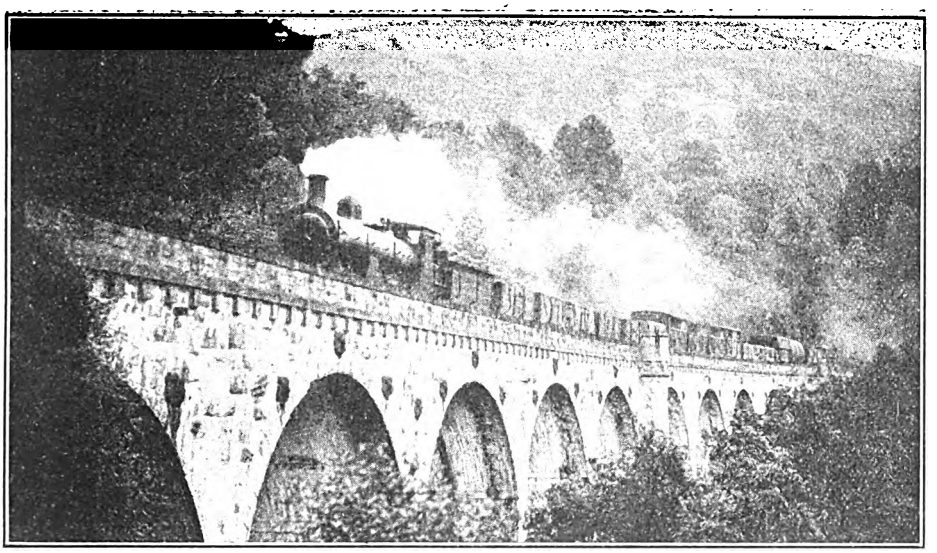


Photo.] [*C. J. L. Romanes.*

GOODS TRAIN CROSSING KILLIECRANKIE VIADUCT.

H.R. 4-6-0 No. 17925.

The Highland Section of the L.M.S.R. in 1927.

By G. E. LANE.

JUDGING from the number of photographs of Highland trains and locomotives which are sent to the offices of THE RAILWAY MAGAZINE, the section of the L.M.S.R. concerned must be in very substantial favour, and, in the course of a year, not a few readers must travel on the route. The interest thus evidenced is, no doubt, due in some measure to the fact that the record of locomotive development on the late Highland Railway provides a somewhat fascinating story, and that its locomotives are named. Other considerations which go to explain why this section of the L.M.S.R. is regarded as of special interest are the fact that really heavy trains, booked non-stop for substantial distances, are worked over mountain gradients, and largely on single-track, in a manner which appeals strongly to the imagination, not to mention the scenic attractions of the various routes, the historic and tourist appeal which the district served offers, and the facilities and conveniences for travel which Inverness and other centres provide for the visitor.

In the case of the present writer, the Highland main line from Perth to Inverness was the first of the three great Scottish mountain routes with which, as a visitor from England, he made acquaintance. It has, therefore, always had a degree of special appeal, and it was with particular pleasure that he took the opportunity to see something of the Highland line as it is to-day, after nearly five years as a section of the London Midland and Scottish Railway.

In many respects, there seems to be little change of an essential character; in others, the differences (including those which belong to the later years of the Highland Railway, as well as those which have been occasioned under the L.M.S.R.) are very marked. Thus, the general features of the train services are very much the same, and many of the developments which have been made in recent years are of the kind which might equally have

Digitized by Google

been introduced by the old Highland Company. But whereas Highland passengers had to depend almost entirely upon the dining-rooms at Perth, Kingussie, Inverness and Bonar Bridge for meals and refreshments during the course of a journey, now nearly every train of any importance has either a restaurant-car or a non-supplement Pullman car for a substantial part, if not the whole, of a journey. On the other hand, though a few Caledonian and other non-Highland L.M.S.R. locomotives are now to be seen here and there, for practical purposes it may be said that the trains are worked entirely by Highland engines. Yet, even here, there is a difference, in that there seem to be very few of these engines which are not numbered and painted in the L.M.S.R. livery. Further, while there is a good deal of Highland passenger rolling-stock in service, nearly all in L.M.S. colours, there appear to be considerable numbers of vehicles transferred from other sections, some indicating clearly their origin, others not so easily identified. This is, however, not altogether due to any idea that Highland passenger rolling-stock is out of date, but arises in large measure from the fact that the provision of restaurant and Pullman-car facilities requires corridor stock with connecting gangways. This type of vehicle was not so necessary under the older conditions, particularly in view of the fact that so many of the principal trains included through coaches, &c., from England, Glasgow and Edinburgh, which were the property of other companies. The change in this respect is, therefore, very marked, and applies, moreover, not only to L.M.S. sets, but also to the L.N.E.R. through services from Aberdeen, as well as from London and Edinburgh.

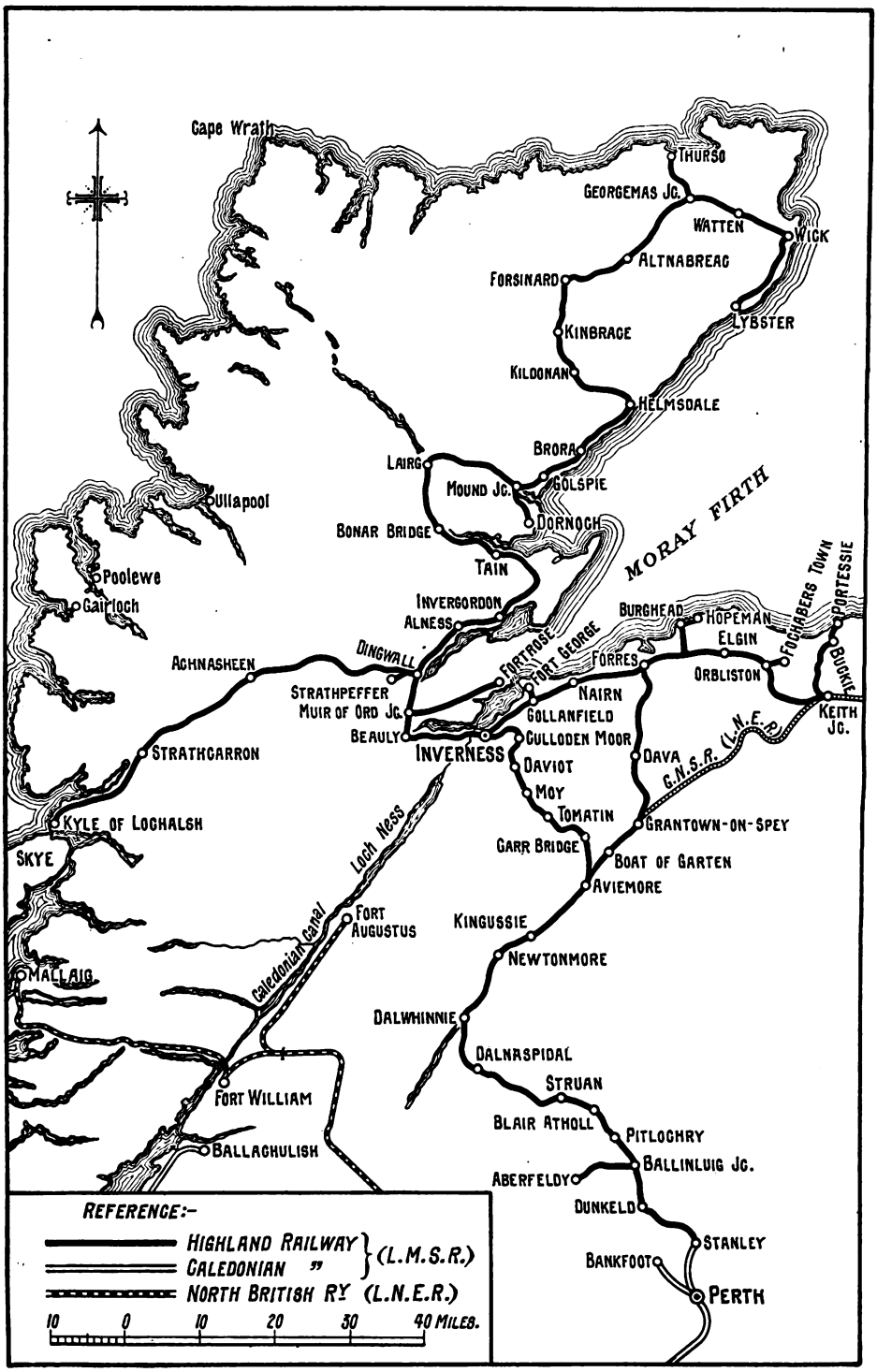
In view of the special importance of the developments in regard to restaurant and Pullman-car facilities, it will be of interest to review this aspect systematically in connection with a survey of the services operated during the 1927 summer season.

The Highland train-service day extends over the whole 24 hours, except for a few fairly lengthy intervals, so that the first down passenger train is that leaving Perth at 1.30 a.m. This is a somewhat slow train, but carries a great deal of very important traffic. It leaves Glasgow (Buchanan Street) at 10 p.m. (Saturday and Sunday nights excepted), and includes a half-sleeping car for Inverness and through carriages from Glasgow to Wick and Thurso, with through vehicles for Elgin added at Perth. This train is really a composite train for Aberdeen and Inverness, and after its arrival at Perth, following connections from Edinburgh (Princes Street) at Stirling, is generally remarshalled, with its various vans, to form the 12.50 a.m. for Aberdeen and the 1.30 a.m. for Inverness. On the Highland section stops are made at many of the more important stations, though the train does not call between Aviemore (where it has connecting services to Forres, Keith, Elgin and Nairn) and Inverness. At Inverness, due 6 a.m., a restaurant-car (this runs as far as The Mound) is added, and the new train leaves at 6.30 a.m. for Wick and Thurso, a somewhat monotonous journey, seeing that almost every station is served, which lasts until 12.55 and 1 p.m., but is well worth making at least once if not more often.

After the 1.30 a.m. has gone, Perth is quiet on the down side until the wonderful series of sleeping-car expresses begins to put in an appearance. These are, according to the public time-table (except on Mondays), 5.5 a.m., with both West and East Coast through carriages and sleeping-cars from Euston and King's Cross respectively; and the 5.30 a.m. similarly constituted, but in this case the through coaches and sleeping-cars travel from Aviemore to Inverness *via* Forres, while a restaurant-car is added to serve breakfasts between Perth and Forres. On Mondays these are replaced by the 5.45 a.m., which divides at Aviemore, the first part (with the restaurant-car from Perth to Forres) to serve Forres and other places on the old route to Inverness, and the second running direct to Inverness, due an hour before the former, with its roundabout route and connections.

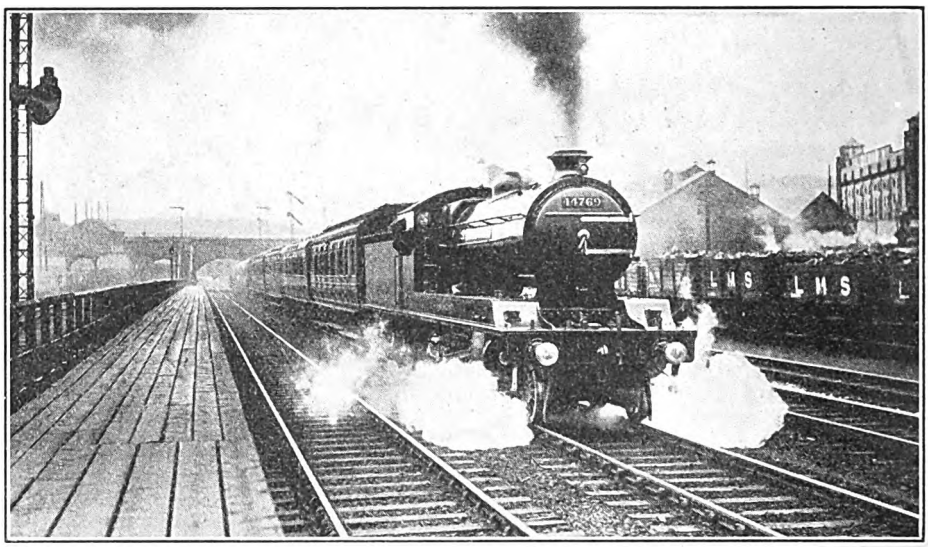
A local train for stations to Blair Atholl leaves at 5.45 or 5.50 a.m., so as to collect at intermediate stations for the 6.25 a.m. mail train. This takes on mails at Perth from the postal train (in winter it also takes the London sleeping-cars which do not form complete trains as in summer, and not infrequently it takes on a few of these

Digitized by Google



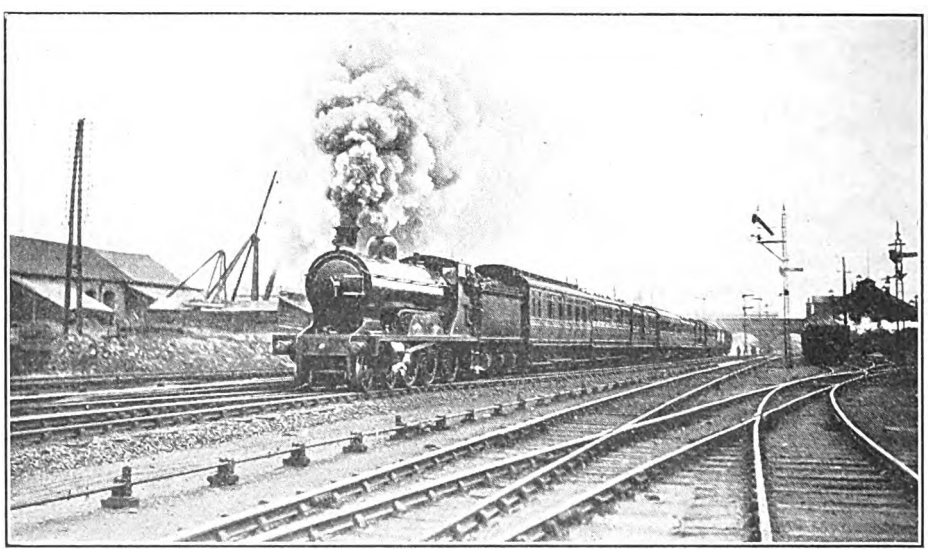
MAP OF HIGHLAND SECTION, L.M.S.R.

Digitized by Google



12.0 NOON GLASGOW AND EDINBURGH–INVERNESS RESTAURANT-CAR EXPRESS LEAVING PERTH.

H.R. 4-6-0 No. 14769. *Clan Cameron.*



Photos.] [*H. Gordon* ***Tidey.***

3.40 P.M. GLASGOW AND EDINBURGH–INVERNESS RESTAURANT-CAR EXPRESS LEAVING PERTH.

Drawn by H.R. 4-6-0 of the "Castle" class.

Digitized by Google

even in summer), and calls only at Blair Atholl (local connection to Struan), conditionally at Dalnaspidal and Dalwhinnie, Kingussie and Newtonmore to Aviemore. It has a Pullman restaurant-car as far as Aviemore, where it forms three trains: 8.50 a.m. fast to Inverness, 9 a.m. stopping to Inverness *via* Forres (with Elgin and Keith connections), and 9.5 a.m. stopping train to Inverness direct. At Inverness, due 9.50 a.m., the fast portion is close behind the sleeping-car trains, and some of the mail and other vans are transferred to the 10.10 a.m. from Inverness to Wick and Thurso, which now includes a restaurant-car as far as Helmsdale. Behind this is the 10.20 a.m. for the Skye line to Kyle of Lochalsh.

The set of trains just detailed is in many respects the most important of the day, because of their sleeping-car and through carriages from London and the mail services, but in practice is not usually quite so simple as indicated. For instance, the West and East Coast trains frequently provide complete and heavy loads individually, so that the West Coast train is often booked from Perth at 4.45 a.m. and the East Coast at 5.5 a.m., or, if either is not quite up to time, in whatever order they can be despatched. There may even be four or five of these sleeping-car trains, and then the mail may have to bring one or more vehicles beyond those definitely scheduled for it, so that the scene at Inverness is exceptionally interesting, in that, as a rule, these trains (as also others which leave with connections) are run past the station and backed into one of the northern platforms to facilitate interchange with the 10.10 a.m. for Wick and Thurso, and the 10.20 a.m. Skye line train. Further, if there are many of these trains running in close sequence it is sometimes a problem to get the empties cleared away in time to release platform space for the next. Indeed, when the "Rush for the Twelfth" is on, punctuality is practically impossible, though it is very exceptional for the serious lateness which used to characterise this traffic to occur now, even in the height of the season.

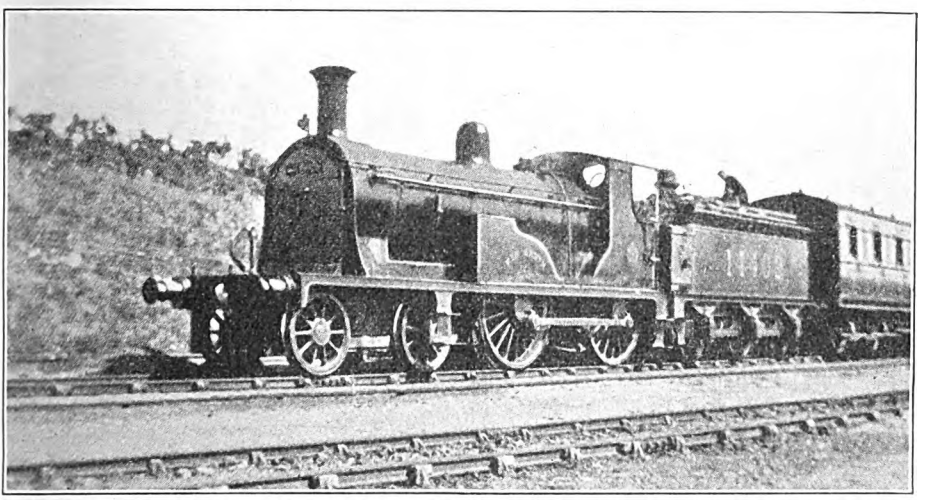


Photo.] [*F. Stapleton.*

L.M.S. (HIGHLAND SECTION) 4-4-0 No. 14402 "BEN ARNIM" AT GEORGEMAS JUNCTION.

Returning to Perth, the next service is the 9.30 a.m. to Inverness *via* Forres, mainly a stopping train, but including a restaurant-car throughout. This is followed by the 9.35 a.m. to Blair Atholl. Then comes the principal Scottish service, the 12 noon from Perth, nominally calling (it usually stops also at Blair Atholl for engine purposes) at Kingussie only to Aviemore, where one part goes to Inverness *via* Forres, and the other direct, both, however, stopping at all or nearly all stations. This train includes L.M.S.R.

Digitized by Google

through carriages from Glasgow (Buchanan Street) and L.N.E.R. through carriages from Edinburgh (Waverley) to Inverness (for the direct portion), and similar vehicles for the Forres section, from which they are detached at Forres to run to Elgin and Keith. A Pullman car is run between Glasgow and Aviemore. This is the great Scottish tourist express for the Highland section, and is, as will be noted, served by L.M.S. connections from Glasgow and L.N.E.R. connections from Edinburgh. Incidentally, this train is often run in at least two sections. It is followed by the 12.10 p.m. stopping train for Inverness, *via* Forres, which also includes through vehicles from Glasgow (Buchanan Street) and Edinburgh (Waverley) for Inverness, with a restaurant-car as far as Aviemore. These two trains involve a considerable degree of re-marshalling at Perth, as they represent recombinations of the respective L.M.S. and L.N.E. trains to that station. The series is completed by the 12.20 p.m. slow train to Blair Atholl.

On Saturdays there is a train for Blair Atholl at 1.45 p.m., and at 3.40 p.m. there is the last through service. This also consists of sections from Glasgow (Buchanan Street) and Edinburgh (Waverley), both for Inverness direct and *via* Forres. It has a restaurant-car from Perth to Inverness, and, although of a semi-fast character, ranks as the important afternoon service for Scottish traffic. After that there are trains at 4 p.m. for Aviemore, 5.30 and 7.30 p.m. (the later on Fridays only) to Blair Atholl, and 8.15 p.m. to Blair Atholl, and on Saturdays to Dalnaspidal.

North of Inverness the 6.30 a.m. conveys through coaches from Glasgow to Wick and from Inverness to Thurso, with a restaurant-car as far as The Mound, the junction for the Dornoch branch. This is mainly a stopping train, but carries a good deal of miscellaneous traffic. At 7.25 a.m. there is a train on Wednesdays in the season for Dingwall and Strathpeffer, and at 9.15 a.m. a stopping train for Tain. During the height of the summer there is a relief at 9.48 a.m., after the arrival of the sleeping-car trains from the south, to Lairg, but ordinarily the 10.10 a.m. is the special north train of the day. This takes on the mails from the 6.25 a.m. *ex* Perth, and has sections for both Wick and Thurso, and includes a restaurant-car as far as Helmsdale. Behind this train is the 10.20 a.m. for Kyle of Lochalsh.

There is then an interval until 3.10 p.m.,

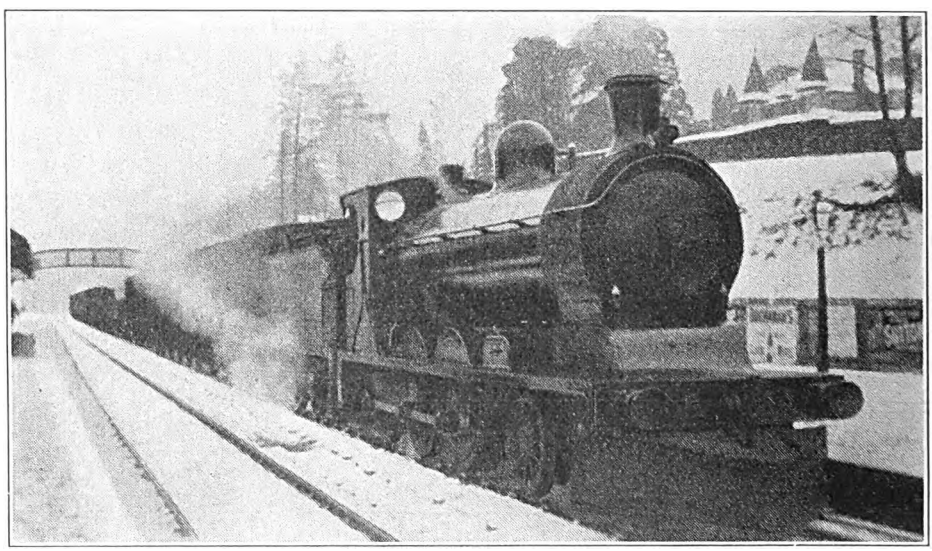


Photo.] [*H. S. C. Everard.*

C.R. 4-6-0 LOCOMOTIVE AT DUNKELD AND BIRNAM STATION, HIGHLAND SECTION, L.M.S.

Digitized by Google

when a stopping train for Helmsdale leaves, and on Fridays in the summer this is followed by the 4.10 p.m. "Further North" express, which calls eight times only on the way to Wick. This is in connection with the morning trains from Glasgow and Edinburgh to Inverness. It has a restaurant-car right through to Wick. The day service is then completed by the 5 p.m. and 8.5 p.m., both terminating at Tain.

In the up direction the arrivals at Inverness from the north are: 9 a.m. from Strathpeffer and Dingwall; 10.35 a.m. from Helmsdale; 2.39 p.m. from Tain; 2.50 p.m. from Kyle of Lochalsh; 3.4 p.m. from Wick (through carriage to Glasgow) and Thurso, with the restaurant-car which worked down to The Mound on the 6.30 a.m. (this is the chief up train and connects with the sleeping-car services to the south); 3.30 p.m. (Saturdays only, return "Further North" express with restaurant-car from Wick to Inverness; 5.56 p.m. from Tain, and 9.39 p.m. from Wick and Thurso, with restaurant-car from Helmsdale.

South from Inverness the principal trains are: 8.30 a.m. direct to Perth, express, but, somewhat strangely, without restaurant-car facilities (this is served at Aviemore by the 7.5 a.m. from Nairn *via* Forres); 10 a.m. *via* Forres, and 11 a.m. *via* Carr Bridge, combined at Aviemore to form the 12.28 and 12.39 p.m. thence, and both with through carriages for Glasgow (Buchanan Street) and Edinburgh (Waverley), and with restaurant-cars from Inverness and from Forres; the afternoon series of trains, consisting of the 3.20 p.m. (a somewhat peculiar relief, as it calls at Newtonmore only for passengers, though it is not particularly fast), the 3.45 p.m., with through carriages from Wick to Glasgow, Inverness to Glasgow, Inverness to Edinburgh (Waverley), and Keith to Perth, with Pullman restaurant-car from Aviemore (this is combined at Aviemore with the 2.10 p.m. from Inverness, *via* Forres, to form the 5 and 5.10 p.m. trains thence); the 4.15 p.m. sleeping-car service to Euston, with restaurant-car from Inverness direct and connections from Nairn and Forres; the 4.35 p.m. second sleeping-car train, for Euston and King's Cross and restaurant-car from Inverness to Perth; 5.20 p.m. to Newtonmore; and the 11.20 p.m. sleeping-car train to Glasgow. Mention may also be made of the 6.50, 8.5 a.m. and 2.22 p.m. trains from Blair Atholl to Perth, with the 8 p.m. on Saturdays with

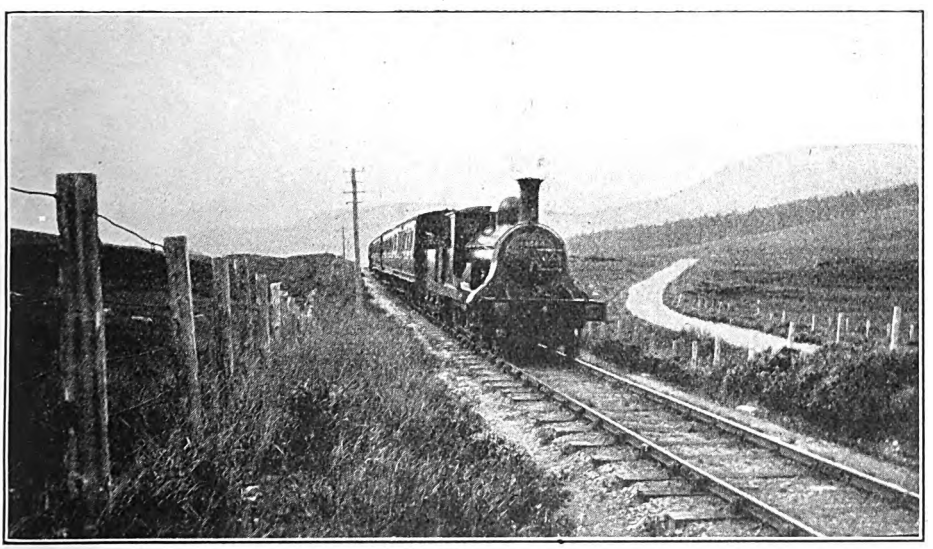


Photo.] [*O. S. Nock.*

KYLE OF LOCHALSH-INVERNESS TRAIN NEAR LOCH LUICHART.

H.R. 4-4-0 No. 14284.

Digitized by Google

return coaches from Blair Atholl to Dundee; 8.50 a.m. and 4.45 p.m. from Struan; and the 11.20 a.m. (with Pullman restaurant-car) from Aviemore to Perth. There is also the 3.30 p.m. from Inverness to Aviemore, in connection with the 5.20 p.m. from Inverness direct for Newtonmore.

In addition to the main-line services, reference is necessary to the trains on the Inverness-Forres-Elgin route, some of which also constitute expresses, though those between Inverness and Aberdeen include restaurant-car accommodation, provided, in this case, alternately by the L.M.S. and L.N.E. companies. The 7.55 a.m. from Inverness is the first of these trains (with restaurant-car), others being the 9.5 a.m. (to Keith only), 11.5 a.m. (express), 1 p.m. (express with L.N.E.R. restaurant-car, transferring to L.N.E.R. at Elgin), 2.20, 3.30, 6.5 and 7.10 (to Keith only). The return trains arrive at Inverness at 8.55 a.m., 11.14 a.m., 11.31 a.m. (restaurant-car), 2.22, 4.45, 5.55, 6.20 (restaurant-car), 9.2, and (Saturdays only) 10.30 p.m. Several of these trains include through carriages between Perth and Elgin or Keith in connection at Forres with main-line services. Most of them include through vehicles between Inverness and Aberdeen.

It will therefore be seen that, for its mileage and in view of the comparatively few trains operated, the Highland section of the L.M.S.R. is now exceptionally well served with restaurant-car facilities, in that nearly every important through service is provided therewith, together with several associated or secondary trains.

In other respects the changes produced by the developments of recent years do not seem to be very great. So far as they are available, the "Clan" engines work the principal main-line trains, assisted as heretofore when the loads are heavy from Perth or from Blair Atholl to Dalnaspidal, and from Aviemore or Inverness to the summit on that section. The "Castle" engines work other trains, or occasionally one of the goods 4-6-0's, while the "Lochs" and "Bens," with a few older engines, work the remaining main line and most of the branch or secondary trains, assisting also on the heavy main-line trains.

There are no regular trains on Sundays, but during the past summer a few half-day express excursions from Glasgow have been run on that day to Inverness.

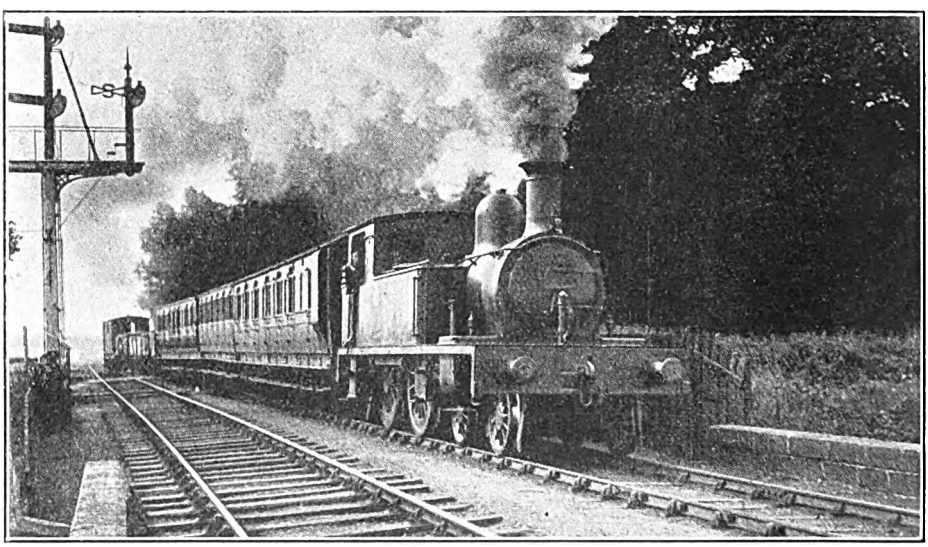
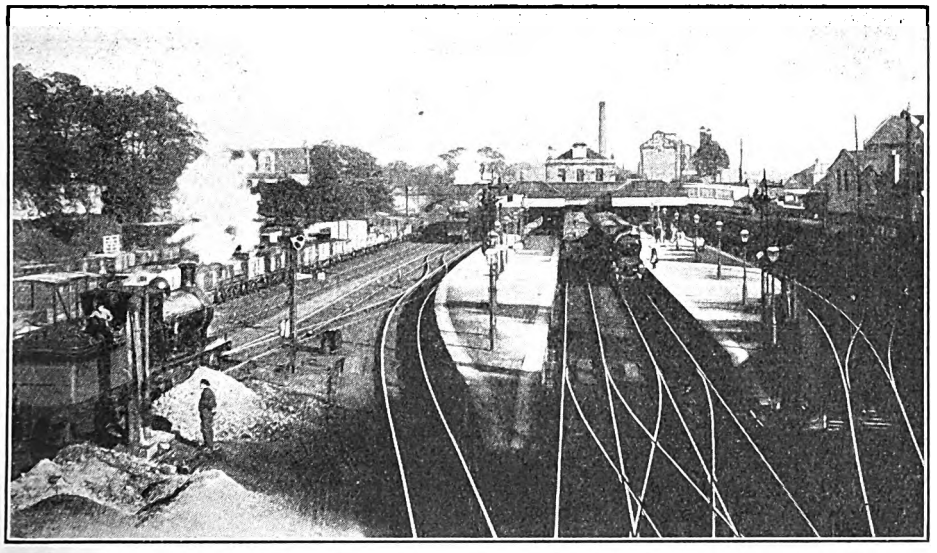


Photo.] [*R. D. Stephen.*

DINGWALL-STRATHPEFFER MIXED TRAIN LEAVING DINGWALL.

H.R. 4-4-0T No. 15014.

Digitized by Google



ALLOA STATION.

From the Forth Bridge to Alloa and Stirling by the L.N.E.R.

By J. FRANCIS.

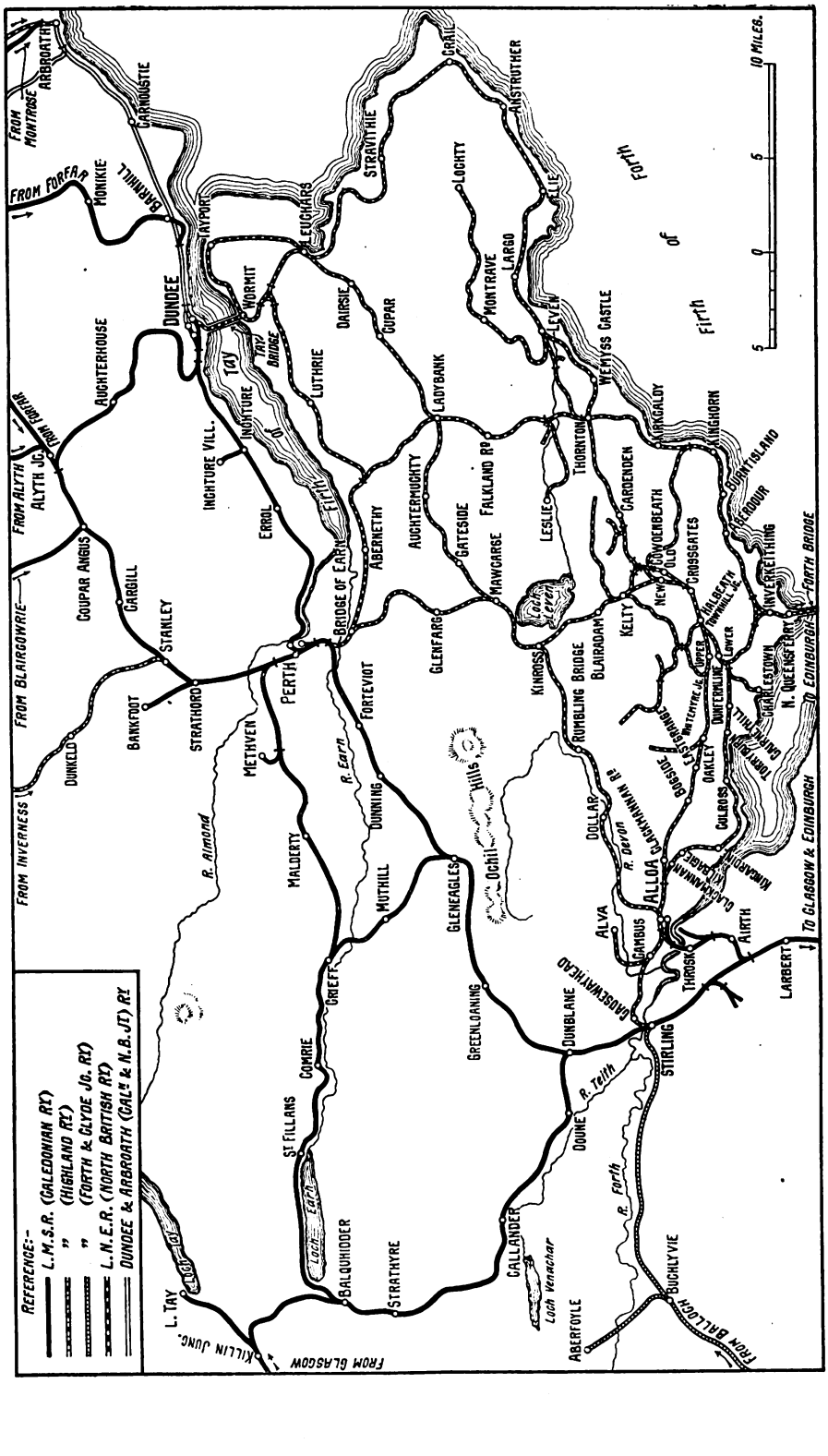
(*Photos. by J. F. Gairns.*)

REFERENCE has been made on several occasions, notably in the January and February numbers, 1927, to the interesting character of the L.N.E.R. lines (formerly N.B.R.) from the north end of the Forth Bridge to Dunfermline and thence westwards to Alloa and on to Stirling, with a further extension, *via* the old Forth and Clyde Junction Railway, to Aberfoyle and Balloch. These remarks were, however, mainly incidental to wider references to the traffic and working thereof at Stirling, the associations of the L.M.S.R. and L.N.E.R. *via* Larbert, and the interesting, and, in some respects, complex features of the L.N.E.R. train working in this area, and as relatively little seems to be known generally about the Dunfermline-Alloa-Stirling or Larbert sections, they are thought to be worthy of detailed attention on their own account.

As will be seen from the map reproduced, Dunfermline is an important traffic centre, especially for mineral traffic, in view of the number of routes which centre upon it. From the south it connects with the Forth Bridge Railway at Inverkeithing Junction, and, *via* the Charlestown branch and the newer line thence to Kincardine, with Alloa. The Perth main line proceeds east and north-east as far as Cowdenbeath, whence a mineral branch continues across to Kirkcaldy, and another line, used by passenger trains, to Thornton Junction. Perth trains then turn north through Kelty and Blairadam to Kinross Junction, where connection is made with a cross-country line from Alloa.

Returning to Dunfermline, about two miles north, there is triangular connection with the older line to Alloa *via* Dunfermline (Upper) and Bogside. Between Alloa and Stirling there is the Alva branch. At Stirling as described a year ago, L.N.E.R. trains use the L.M.S.R. station, also exercising running powers south to Larbert and round to Glasgow or to Edinburgh *via* Falkirk (Grahamston). Certain trains also run *via* Alloa Bridge direct from Alloa

Digitized by Google



SKETCH MAP OF RAILWAYS IN AREA CONSIDERED.

Digitized by Google

to Larbert, this being another running power arrangement. From Stirling the Forth and Clyde Junction Railway proceeds east to Buchlyvie (for the Aberfoyle branch) and to Balloch (for Loch Lomond), connection being made at Gartness Junction with the route to Aberfoyle from Glasgow *via* Kirkintilloch. Besides the lines mentioned, there are several mineral branches, particularly in Fife.

Dunfermline was at one time the Royal City of Scotland, and has many historic associations. It is therefore visited by tourists in large numbers, the Abbey being an especial attraction, though the city has many buildings, monuments, &c. Near the Abbey are the ruins of the ancient Palace of Dunfermline. The town is a great centre for the linen industry.

As considerable interest attaches to the lay-out and traffic arrangements in this district, it will be desirable to start at the north end of the Forth Bridge, at North Queensferry station. This is, of course, at bridge level, as south-going trains pass directly on to the northern non-cantilever span. From the station one looks down upon the village of North Queensferry, with its harbour, to which the old branch line is still in use. This is at first on the west of the Forth Bridge but, after disappearing from view as the main line traverses a short tunnel followed by rock cuttings, passes under a viaduct to the eastern side. It then rises, alongside Inverkeithing Harbour, and joins the main line, together with the Harbour branch, at Inverkeithing station.

North of the station the present Aberdeen route turns eastwards to follow the Fife coast to Burntisland, Kirkcaldy and Thornton Junction, while the Dunfermline route proceeds north-west, with goods loops on either side of the running lines, until connecting with a direct curve from the Perth to the Aberdeen mainland. A little further along is Rosyth Halt, built to serve the Naval Dockyard on the Forth. Then, by the Dunfermline Gasworks, the Charlestown and Kincardine line comes in, these trains thus approaching Dunfermline (Lower) station from the south.

Dunfermline (Lower) station, so named to distinguish it from the "Upper" station, on the older Alloa route, has an island platform on the up side, the outer face of which is often used by local trains, while on the down side there is a bay at the north end. The station is rather sharply curved. There are, however, but few trains which do not stop, as the Edinburgh-Perth expresses usually call at Dunfermline and Kinross Junction, if not at one or more other stations in addition. Alongside the "Lower" station are sidings. Although on the outskirts of the town of Dunfermline, the "Lower" station is rather busier than the "Upper" station (about three-quarters of a mile away by road and over two miles by rail) because of the interchange and connection facilities it provides. It is frequently practicable, however, to make a close connection with a train to or from the "Upper" station, while many of the trains which cover this journey are through between Edinburgh and Stirling, thus meeting many requirements in this connection without involving a change of train. Some of the local trains, too, continue from the "Lower" to the "Upper" station. Local passengers, however, generally use the "Upper" station, if making journeys for which that is convenient.

Leaving Dunfermline (Lower) station in a north-bound direction, trains for Alloa leave the main route at Touch South Junction, and thence proceed round to Touch North Junction, a third side of the triangle here providing for trains working from Dunfermline (Upper) to Townhill Junction and thence to Halbeath, Cowdenbeath, &c. Before reaching Dunfermline (Upper) station extensive low level carriage sidings may be noted, together with engine sheds, goods lines, &c.

The station is a fairly busy one, and a good part of each platform is roofed. On the down side there is a terminal bay. Everything suggests, indeed, an important station and one dealing with a considerable amount of traffic, while the surroundings indicate industrial activities on a substantial scale.

As this is a busy route it is double-track throughout to Alloa, while there is a colliery branch leaving at Whitemyre Junction (this branch has several offshoots and is extended all the way to Kelty to rejoin the main line, also having a connection to Halbeath), and a siding known as "Summit" before the first station, Oakley (Fife) is reached. Just beyond

Digitized by Google

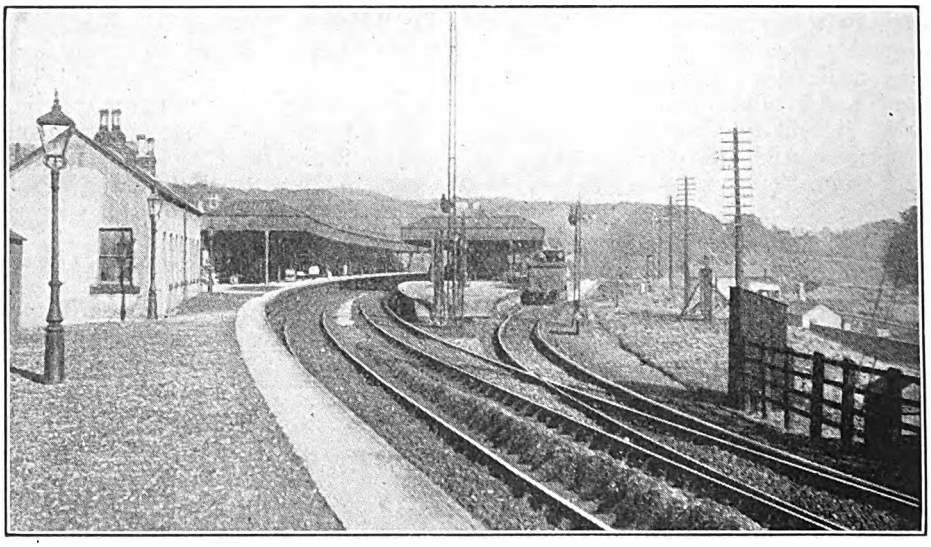
the station another branch diverges to serve Oakley Colliery.

By this time the route is traversing rather picturesque country, of the undulating kind, with here and there a cutting or an embankment or viaduct over a pretty valley. There is nothing very special, however, about the stations at East Grange and Bogside, but beyond Forest Mill colliery activities again show themselves, particularly at Tullygarth Siding. Then comes Clackmannan Road station, not a great distance from Clackmannan station on the Kincardine line, with which connection is made about three-quarters of a mile further along at Kincardine Junction. Thence to Alloa is a fairly busy section, with colliery and goods traffic connections at Whinhill Colliery and Hilton Road sidings. Approaching Alloa an old ticket-collecting platform may be noted, dating from the days when so many junction stations were open and trains stopped outside for collecting purposes.

The branch from Dunfermline to Charlestown dates back to the 'fifties, when it was constructed by local enterprise. The Kincardine line from Alloa is also an old one, having been built in 1893. The intervening line, from the Charlestown branch at Elbowend Junction to Kincardine is of much later date, and was opened for traffic in 1906. Leaving the main line by the Dunfermline gasworks, the branch is single from Charlestown Branch Junction. There is a passing loop at Elbowend Junction, though the actual junction with the Charlestown branch is from the single line immediately beyond. Charlestown, on the banks of the Firth of Forth, is 4½ miles from Dunfermline. The branch itself is now closed for passenger traffic.

Continuing towards Kincardine, Alloa trains serve, first, Cairneyhill station, 3 miles beyond Elbowend Junction. Another 1¼ miles and Torryburn is reached. Just beyond, the line curves down directly to the water's edge, and for the next 6 or 7 miles affords magnificent views over the spacious waters of the Firth. Valleyfield siding serves a fairly big colliery, having some of its sidings, serving a jetty, located on a neck of land between the railway proper and the water. There is, however, no station here, though a passing loop is provided.

Continuing along the water side, in places divided from the sands by a stone wall only, and for some distance having a public walk railed off between the railway and the Firth of Forth, the route continues until the station of Culross is reached. This was built for double line, but one platform is disused and the track taken



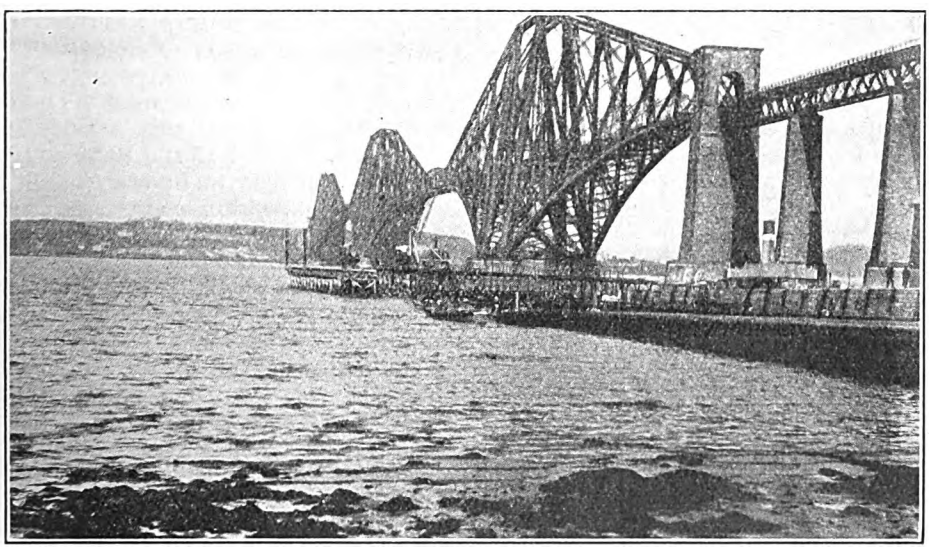
DUNFERMLINE (LOWER) STATION.

Digitized by Google

up, as Valleyfield siding meets all crossing requirements on this section. Culross is a fairly busy place, the town being on the hill slopes inland from the station. Still following the Firth very closely, and passing Sands siding, the neat little station serving the county town of Kincardine is reached. The pier is adjacent to the station, with the town beyond the railway. A little further on the line turns inland to serve Kilbagie, Brucefield colliery, and the town of Clackmannan. Just beyond the river is crossed and connection made with the direct Dunfermline-Alloa line at Kincardine Junction.

abrupt junction for the route north to Kinross junction and Perth, trains for Dunfermline, by either route, continuing more directly eastwards. At the west end there are two terminal bays, used by L.N.E. and L.M.S. terminal services. On the north side are engine sidings, and towards the east end a few carriage sidings, though accommodation is somewhat restricted. The station is neatly designed, modern in character, and has refreshment rooms and other facilities as required at a busy interchange station.

Leaving Alloa in a westward direction, and traversing a part of the town which



THE FORTH BRIDGE.

From the bank at South Queensferry.

Alloa is a thriving industrial town, with a worldwide reputation for its yarn. The station is a fairly big one and is the centre of a considerable amount of local and interchange traffic. It is in the form of an island, reached from neighbouring thoroughfares by an overbridge leading to the main circulating area from which all platform faces are accessible. The situation is, however, somewhat complicated by a public road bridge which crosses the station intermediately. The outer faces of the island are principally used by through trains, or by trains which make continuation journeys, as is sometimes done. At the east end there is a rather

strongly supports its reputation for picturesqueness, and passing a rather busy level crossing, Alloa West junction is reached. Here the L.M.S. line direct to Larbert, *via* Alloa Bridge, diverges to the south, while trains bound for Stirling continue to Cambus. This is the junction for the Alva branch, and on the north side there is a bay platform for branch trains, though most of them now work through to and from Alloa. Continuing towards Stirling, the River Devon is crossed, and a little further on are the Manor Powis colliery sidings. This section is along the base of the Ochil Hills.

By this time, stretches of the River

Digitized by Google

Forth came into view to the south, still of fair width, as it has several miles of winding course to make before it passes under Stirling bridge, barely three miles away by rail. Then comes into view, to the north, as Causewayhead station is neared, a steep tree-clad hill, the Abbey Craig, on which is placed the famous Wallace Monument, to see which so many people journey to Stirling. A further short run and the L.N.E.R. line comes in alongside the L.M.S.R. main line from Perth, to cross the River Forth by parallel bridges, as described in the January, 1926, number. After crossing the river, there are L.N.E.R. goods and engine sheds, while on the other side of the L.M.S.R. connection is made with the Forth and Clyde Junction line of the L.N.E.R. across to Balloch and Loch Lomond.

Although the whole of the direct route between Larbert and Alloa is L.M.S. property, a few remarks in regard thereto will be of interest, especially in view of the fact that certain L.N.E.R. trains travel this way by virtue of running powers. The L.M.S. main line is left at Alloa Junction two miles north of Larbert, and trains then turn east and north to Airth. About a mile and a half beyond, at Dunmore Junction, a goods branch diverges to serve Alloa South Goods Depot, on the south side of the River Forth. Other trains continue to Throsk Platform, actually a station, from which good views of the viaduct and of the stretches of the Forth are to be had. The bridge itself is single-track, though otherwise the route is double throughout. Then at Longcarse Junction, a branch is put off to serve Alloa North Goods Depot and Alloa Docks, while at Alloa West Junction, connection is made with the L.N.E.R. branch from Stirling.

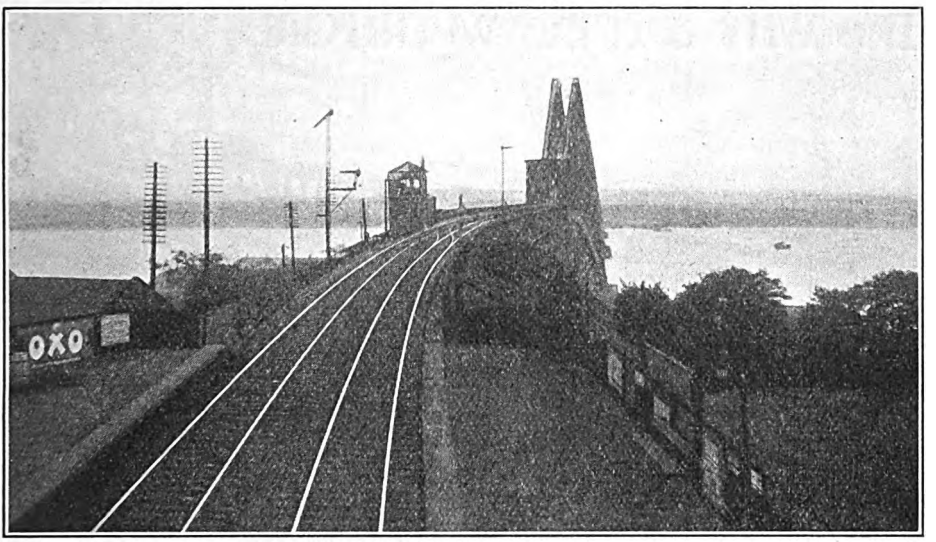
In that they provide the main-line facilities for Dunfermline, the Edinburgh–Perth trains may be first considered. These include expresses or semi-fast trains which call at Dunfermline (Lower) from Waverley at 7.29, 10.7 a.m., 2.6, 6.37 and 9.25 p.m., with stopping trains at 6.45, 8.35 a.m., and at 12.35 and 4.31 p.m. There are also the early morning trains conveying the Highland sleeping-cars, these being the only ones to pass Dunfermline without calling. The 7.29 a.m. from Waverley carries, however, a sleeping-car from London to Perth, so that Dunfermline passengers can use this to destination, as also through carriages. The 10.7 a.m. and 2.6 p.m. have through carriages to Inverness, while the 6.37 p.m. includes through vehicles from London off the down "Flying Scotsman." In the up direction, Dunfermline has express services at 9.22 a.m., 1.17, 4.25, 9.6 and 10.6 p.m., the last two including sleeping-cars as well as through carriages for London. Stopping or semi-fast trains leave for Edinburgh at 7.51, 10.30 a.m., 3.49 and 6.59 p.m., while the 9.30 p.m. gives a service *via* Inverkeithing.

From Edinburgh there are also the through trains to and from Alloa and Stirling, which amplify very materially the facilities above outlined. Further, these trains also serve Dunfermline (Upper) station, and are thus, in some respects, of greater value to the city itself. There are stopping trains on this service from Waverley at 5.53, 7.55 and 10.35 a.m., and at 1.20, 4.10 (fast to Inverkeithing), 5.35 and 7.55 p.m., with two expresses or semi-fast trains. Of these, the 9.15 a.m., which calls only at the two Dunfermline stations, and at Alloa, to Stirling, conveys through coaches to Aberfoyle and Balloch to meet the needs of Trossachs Tour passengers, making the trip either way. The 6.37 p.m. is fast to Dunfermline (Lower) station, and then serves several, but not all stations. In the opposite direction, the 7.53 a.m. from Stirling terminates at Dunfermline (Upper), as it serves as a pick-up for the 8.15 a.m. semi-fast from Stirling, other trains being the 10.5 a.m., 12.10, 1.40, 4.0, 5.48 and 8.27 p.m., also from Stirling. Several of these are more or less semi-fast. The 8.27 p.m. brings the return through coaches from Aberfoyle and Balloch.

On the Kincardine branch there are, normally, two trains only each way daily working throughout, with two additional trips (one on Saturdays only) between Alloa and Kincardine.

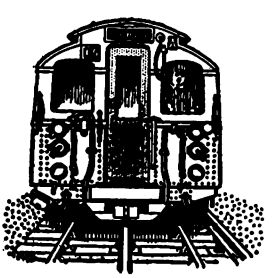
Alloa has through L.N.E.R. trains from Glasgow at 9 a.m. and 10.5 p.m. *via* Stirling, and at 1.32, 4.47 and 7.38 p.m. *via* Larbert and Alloa Bridge. Of these, the 9 a.m. and 4.47 p.m. work through to Perth, and the 7.38 p.m. to Kinross Junction, the 1.32 and 10.5 p.m. terminating at Alloa. There are, however, several other trains, giving, in the aggregate, quite a

Digitized by Google

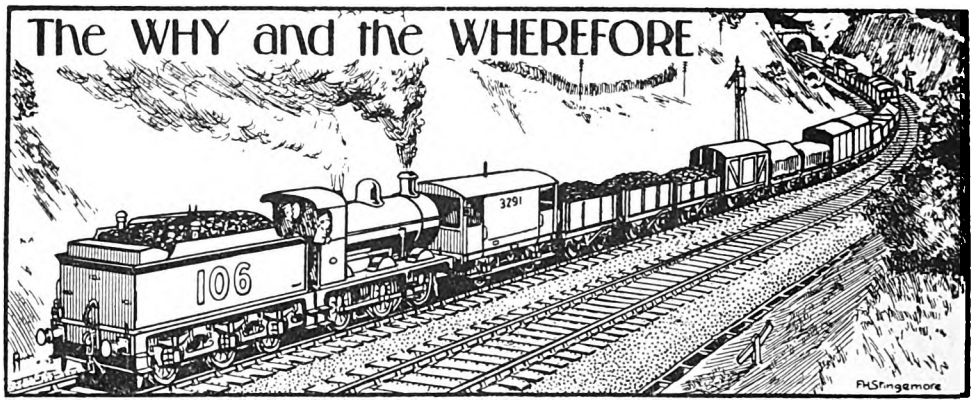


THE FORTH BRIDGE, FROM NORTH QUEENSFERRY STATION.

good service, from Alloa to Dollar, Kinross Junction, Ladybank or Perth. In the opposite direction, the through trains for Glasgow leave Alloa, *via* Stirling, at 7.45 a.m., and 9.15 a.m. and, *via* Alloa Bridge and Larbert direct, at 9.21 a.m., 1 (Saturdays only), 2.24 and 5.34 p.m. As Alloa also has local L.N.E.R. trains to and from Stirling and local L.M.S.R. trains to and from Larbert, the aggregate result is that it deals with a substantial number of trains in the course of the day. A large proportion provide inter-connecting services of a useful character.



Digitized by Google



RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. Applications for information concerning "British Locomotive Practice and Performance" may be addressed to Mr. Cecil J. Allen, c/o* RAILWAY MAGAZINE, *33, Tothill Street, Westminster, London, S.W.1. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book"* (5s. *net*) *should be consulted. The thirtieth Annual Edition* (1927) *of this standard railway reference work is now published. All previous Editions are out of print.*

Rail Motor Cars.

In further reference to a reply given in the last issue under this heading, the most generally-accepted meaning of the term "rail motor car" is probably a combined engine and coach, the engine being housed in one end of the vehicle, as, for example, the "Sentinel-Cammell" type of car. Up to the present only the Great Western Railway has built rail motor cars extensively, but there are indications of this handy type of vehicle again coming into favour for branch-line operation, owing to the highly efficient results obtained with the Sentinel-Cammell and Clayton cars. "Motor trains" (sometimes called "auto-trains" or "push-and-pull trains") consist of a number of coaches, varying from one to six, coupled to an engine, and so fitted that the complete train concerned can be driven from either end. If the train consists of two coaches only, the engine is usually located at one end; if of four or six, the engine is then in the centre. At the end of the outermost carriage is the auxiliary driving compartment, fitted with controls which operate the regulator, brake, whistle, &c., on the engine. The fireman, of course, always remains on the footplate. The chief advantage of the rail motor or motor train is that they obviate the time and trouble of running the engine round its train at terminal stations.

[Further reply to "DORSET READER."]

Station Signalling.

The treadle you show would be for the home signal of "B" box. That for the starting signal of "A" box would be on a line in the station. The difficulty you point out is now met by track circuit. Where that is not provided reliance has to be placed solely on signalmen's observation. The repainted coaches you have noted are probably used for certain special traffic and are not employed in general service.

[Reply to H. A. POPER.]

Speeds at Radlett, L.M.S.

Speeds of the fastest up expresses of the Midland at the bottom of the dip between Napsbury and Radlett are generally round about 75 m.p.h., not infrequently reaching the "80" mark. On the down journey, over the falling gradient from Elstree to Radlett speed generally reaches 68 m.p.h. or so, but seldom much exceeds 70. You can take it that such a speed as 96 m.p.h., which you quote, has never been attained here, and has probably

Digitized by Google

been reached on one or two occasions only, with the steam locomotive, in any part of the world. If you wish to know other places in England where high speeds are regularly attained, you should read Mr. Cecil J. Allen's monthly articles on locomotive performance.

[Reply to W. S. BOYCOTT.]

Non-Stop Runs.

Prior to the advent of the new "Royal Scot" engines of the L.M.S., all the three non-stop journeys previously made between Euston and Carlisle were accomplished by Webb compound locomotives. First to achieve the feat was the 3-cylinder compound 2-2-2-0 engine *Ionic*, and the 1902 runs in both directions were made by the 4-cylinder compound engines *Commonwealth* and *C. H. Mason*, coupled together. We should be interested to know on what authentic record you base your claim that in 1876 the Pennsylvania Railroad of the U.S.A. made a run with no actual stop of any kind over the 438½ miles between Jersey City and Pittsburgh, as we have never heard such a claim advanced in seriousness previously.

[Reply to W. T. HOECKER.]

Platelayers' Trolley in Section.

Owing to its comparative lightness, a platelayers' trolley cannot be depended upon to shunt the relay of a track circuit or to operate the rail contacts. Hence, it would not protect itself under automatic signalling conditions, as in the case of a train or standard vehicle. It is not, in fact, usual to protect platelayers' trolleys by the fixed signals, and the men are required to look after themselves by displaying a large red flag and watching the running signals so as to be prepared for trains, though when platelayers are definitely working in a section the signalman is expected to give a general oversight and to take measures to protect them by his own signals if necessary.

[Reply to "BRONDESBURIAN."]

L.M.S. Locomotive Classes.

Practically every one of your questions contravenes the rules at the head of these columns as to queries involving engine numbers. There were several large superheated 0-6-4 tank engines built for the North Stafford section of the L.M.S., all of which are still at work; they can be readily distinguished from the Midland 0-6-4 tanks in that the side-tanks of the latter extend to the front of the smokebox, whereas those of the latter terminate at the middle pair of driving wheels. The "13000" class consists entirely of 2-6-0 tender engines of the new outside cylinder type.

[Reply to L. M. S.]

Locomotive Acoustics.

Any irregularity in the relative loudness of the four or six exhausts of a locomotive is generally due to slight inaccuracies in valve setting. These are often particularly noticeable with 3-cylinder engines, and probably arise from the derived valve-motion employed for the inside piston-valves of many of these engines, which tends to accentuate any such irregularities. We had not noticed the differences in locomotive painting to which you refer; the superior finish may arise from additional coats of paint or varnish, or from better attention at the locomotive sheds.

[Reply to E. P.]

Record Speed with a Midland Compound.

Mr. Chas. Rous-Marten recorded a maximum rate of 96 m.p.h. with one of these engines in the descent from Blea Moor to Settle, but beyond stating that this was one of the original "2631" series of five engines, in its original condition, we are unable to state the actual number of the engine concerned. Your other query concerning the run of Great Eastern oil-burning 2-4-0 engine No. 761 from St. Pancras to Scarborough will receive attention in "Pertinent Paragraphs."

[Reply to "DONHEAD."]

The Longest Continental Non-Stop Run.

By information received just too late for inclusion in the last issue, we find that you are incorrect in claiming the lately-established non-stop of the French Nord Railway between Paris and Dunkirk (in connection with the Tilbury steamer service) as being the longest operating on the Continent. The actual distance is 189·6 miles, whereas the Paris-Brussels non-stop journey of the "North Star" Pullman express is 193 miles without intermediate stop. The former does, however, take second place, third place being

Digitized by Google

claimed by the 184·3-mile Paris-Calais journey of the "Golden Arrow."

[Further reply to "YORK."]

Gradients.

We were not aware that any gradient of such exceptional severity as 1 in 14 exists on the Cromford and Parsley Hay line of the L.M.S., apart from the assistance of rope haulage, and wonder if it is not possible that you may have misread the gradient board. Such an incline could only be operated, of course, with the very lightest of loads. A gradient of 1 in 14, adhesion-operated, is not, however, unique, as it is the ruling gradient of the electrically-worked Bernina line in the Canton of the Grisons, Switzerland.

[Reply to "WILBRAHAM ROAD."]

Heavy Express Trains.

The heaviest regular express on the L.N.E. system is the 4 p.m. from King's Cross to Leeds, Bradford, York, Scarborough, Cleethorpes and Woodhall Spa, which generally takes out 15 or 16 coaches, including two dining cars for Newcastle. A 16-coach-train of this formation may be expected to weigh approximately 500 tons empty, and is considerably heavier than the average weight of the "Royal Scot," mentioned by you, especially with the latter's reduced winter loading.

[Reply to F. MITCHELSON.]

4-4-2T Locomotives, S.R.

The engine numbered B2 which you noted at Brighton is one of a series of such engines with 5-ft. 6-in. coupled wheels, generally similar to the "B22" class, which have 6-ft. 9-in. coupled wheels, and are intended for express train working. The former class are fairly big engines, but are used mainly for branch and suburban traffic working. Obviously, the number has no relation to the order of building, in that there have been several number two's since the early days of the L.B. & S.C.R.

[Reply to C. H. LEWIS.]

Glasgow-London Excursion, L.M.S. (Midland Section).

Leaving Carlisle at 11 p.m., the Friday night up excursion from Glasgow to London by the Midland route was booked during the summer to call at Hellifield (12.42–45 a.m.); Engine Shed Junction, Leeds—the train did not enter Wellington Station—(1.32–36 a.m.); Masborough Sorting Sidings (2.20–25 a.m.); Trent Junction (3.30–33 a.m.); and Leicester (3.49–4.4 a.m.); arriving at St. Pancras at 6.15 a.m.

[Reply to "EMMA."]

Rail-lengths.

Standard rail-length on the Western Division of the L.M.S., now in course of introduction on other sections of the same railway, is 60 ft., as compared with the 45 ft. in general use elsewhere, and the 48 ft. of the late Caledonian Railway. The distinctive rail-joint rhythm of West Coast journeys is thereby explained. We understand that 60 ft. rails are also to be introduced shortly as a standard on the main lines of the L.N.E.R.

[Reply to B. B.]

Mixed Traffic 4-6-0's G.C. Section, L.N.E.R.

The principal dimensions of the standard 4-cylinder mixed traffic 4-6-0 locomotives designed by Mr. J. G. Robinson and in service on the L.N.E.R. are as follow:—Cylinders, 21 in. by 26 in.; coupled wheels, 5 ft. 8 in. diam.; boiled pressure, 180 lb. per square inch; total heating surface, 2,123 sq. ft.; grate area, 26 sq. ft.; weight on coupled wheels, 53 tons 14 cwt.; total weight of engine and tender in working order, 121 tons 4 cwt.

[Reply to "GRAND CENTRAL."]

Locomotives withdrawn from Service.

Particulars of locomotives withdrawn from service are frequently included in "Locomotive Matters," and if you trace through recent issues you will, no doubt, find particulars of most of the L.M.S. (L.N.W. section) locomotives mentioned by you. We cannot, however, include lists of this kind. The pump you have noted attached to the smokebox of R.O.D. 2-8-0 locomotives is the Westinghouse air pump.

[Reply to E. B.]

Engine Sheds.

Particulars of the chief engine sheds on the leading railways are given in *The Railway Year-Book*. If you have not seen a copy, we suggest that you purchase one of the 1927 edition (of which copies can still be supplied, price 5s. each, or by post, 5s. 6d.), in view not only of the information given on this matter, but of the

Digitized by Google

wide range of other useful material included.

[Reply to BERNARD M. RUDGE.]

Southern Railway "King Arthur" Class Locomotives.

The first "King Arthur" class engines placed in service on the Southern Railway took the numbers of 4-cylinder 4-6-0 locomotives of the late Mr. D. Drummond's design. They are, however, replacements of these engines and not rebuilds. No. 0449, the engine on which Mr. Maunsell experimented with the 135° crank arrangement was one of Mr. Drummondi's 4-6-0's

[Reply to E. A. BARKWORTH.]

Locomotive Works of English Railways.

The total ground area of Swindon Works amounts to 309½ acres, of which 65 acres are roofed. The following is a list of issues of THE RAILWAY MAGAZINE, in which the locomotive works you mention were described:—Doncaster, May, 1913; Crewe, April, 1913; Derby, April, 1914; Swindon, October, 1901; and Eastleigh, January, 1911.

[Reply to "JOYOUS GARD."]

Coal Consumption on Birmingham Services.

Of the two figures that you mention, you may take it that a coal consumption figure of roughly 35 cwt. between Euston and Birmingham on an average two-hour train is correct; it works out at about 35 lb. per mile. Your other figure is quite impossible; many of the tenders in use, in fact, have barely so high a coal capacity as 5 tons.

[Reply to H. P. DICKINSON.]

Met. and L. & N.E. Joint Line.

Operating a joint service and complete amalgamation are two very different things; although the L. & N.E. and Metropolitan Companies work a joint train service to Rickmansworth and Aylesbury and beyond, there has never been any suggestion of an amalgamation between the two lines. Your question as to uniform colours of locomotives does not, therefore, arise.

[Reply to "PACIFIC."]

Southern Railway Locomotive at Maidenhead.

It is possible that you saw an S.R. Drummond 0-4-4 tank engine at Maidenhead, G.W.R., in that, now and then, locomotives travel specially on to the lines of another company, but this seems very unlikely in the particular instance. We can only conclude that you saw a G.W. locomotive of a class unusual in the London area.

[Reply to "STAFFORDSHIRE KNOT."]

Stars on Smoke-box Doors.

We gather from your remarks that you refer to the stars sometimes seen on the smoke-box doors of locomotives. These stars have been made by scouring off the paint and polishing with emery cloth or other abrasive. They are usually made by the cleaners for decoration purposes only, and some very effective and complicated geometrical designs may sometimes be observed.

[Reply to T. C. L. MISLE.]

L.M.S. "Royal Scot" Engine.

We do not quite know what you mean by being "built on 'Castle' lines." We are not aware, indeed, of any feature of the new L.M.S. engines which specially favours Swindon practice; the "Royal Scot" is in every way a new and original design, and in many respects—as, for example, 3-cylinder propulsion and the parallel boiler—there are substantial divergences from G.W.R. standards.

[Reply to J. H. L. ADAMS.]

Transition Curves.

In the best permanent-way practice it is now usual to lead off from a curve on to a straight, not by a true tangent, but by a parabolic curve, or "transition spiral," which has the effect, in particular, of simplifying the problem of running out to zero the super-elevation of the outer rail at the end of the curve. It is, of course, in the case of the sharper curves that the transition spiral offers the most advantage.

[Reply to G. E. FENTON.]

Signal Repeaters.

Connections from signal to telegraph posts usually indicate that electrical apparatus is provided at the back of the semaphore arm to indicate to the signalman, in his cabin, whether or not the arm is working properly. Such signal "repeaters" are always provided to "repeat" the movements of signal-arms which are invisible from the signal-boxes.

[Reply to G. E. FENTON.]

Digitized by Google

Bala Junction.

Passengers are not taken up or set down at Bala Junction, on the Great Western line from Ruabon to Dolgelley, which explains the omission of this junction from the G.W. time-tables. The junction platforms are maintained only to allow of through trains to and from the Dolgelley direction making connection, by branch trains, with Bala.

[Reply to " G. W. ENTHUSIAST."]

L.N.E.R.—Metropolitan Joint Railway.

In the agreement reached between the Great Central Railway and the Metropolitan Railway, which formed the subject of a joint Bill passed through Parliament in 1905, a lease for a period of 999 years was granted by the Metropolitan Railway to the Great Central Railway of the railway from Canfield Place to Harrow South Junction at a yearly rental of £20,000

[Reply to R. D. JAMES.]

Up " Cornish Riviera " Express.

During the winter this train calls daily at Exeter, 1.39 to 1.45 p.m., and is so shown in the current issue of " Bradshaw," in each table in which it appears. In the summer the Exeter stop is omitted, but the departure from North Road, Plymouth, at 12.30 p.m. and the arrival at Paddington at 4.45 p.m. remain unaltered.

[Reply to " MOSSLEY HILL."]

Droitwich Road Station.

Mr. A. D. Pennington states that a former station master has informed him that Droitwich Road was at one time used as a passenger station and was at first named Droitwich, " Road " being added in view of the fact that objection was raised to its description, seeing that the town of Droitwich is two miles away.

[Further reply to the REV W. P. GILPIN.]

Tender Springs.

In earlier days it was a common practice to arrange tender springs above the running-plate, but this is seldom, if ever, done now, the customary position below the running-plate being more convenient for various reasons. We are unable to explain the reason for the varying sizes of engine numerals adopted on the Southern Railway.

[Reply to C. H. LEWIS.]

" King George V " Engine, G.W.R.

For the purpose of working trains on American railways in connection with the exhibition at Baltimore, *King George V* was fitted with the Westinghouse brake. It is doubtless the air-compressor, or donkey-pump, to which you refer when you mention the " two small drums on the right of the smoke-box."

[Reply to E. HANCOCK.]

4-6-4 Tank Locomotives, Nord Railway of France.

A series of tank engines of this wheel arrangement, with inside cylinders, distinctly British in external lines, was being completed for Holland by the North British Locomotive Company at the outbreak of war, and was by arrangement transferred to the Northern Railway of France.

[Reply to H. C. HORTON.]

Scottish Railway Articles.

The Great North of Scotland section of the London and North Eastern Railway was described in the February, 1925, issue of THE RAILWAY MAGAZINE, while the Joint Station at Aberdeen formed the subject of an illustrated descriptive article in the January, 1921, issue. Both these numbers are now out of print.

[Reply to GORDON BLACK.]

Proof House Junction, L.M.S.R.

The junction of the main Euston-Birmingham, Midland and Sutton Goldfield lines to the east of New Street is known as " Proof House." We do not know the exact derivation of the name, unless it be that one of Lloyd's Proving Houses for the testing of chains and other material is in the immediate neighbourhood. [Reply to K. W. WOODWARD.]

L.M.S. (L.N.W.) 4-6-0 Locomotives.

The main difference between the " Experiment " and " Prince of Wales " classes of 4-6-0 locomotives is that the former used saturated steam and the latter are fitted with superheaters. As the " Prince of Wales " class were built later, they also include a few minor improvements and changes.

[Reply to " SIR NEROVENS."]

Exhaust Beats L.M.S.R. Locomotives.

The rapidity of the exhaust beats when running of the new 4-6-0 locomotives of

Digitized by Google

"The Royal Scot" class in service on the L.M.S.R., is due to the 120 deg. crank setting, the engines having three cylinders, and thus exhausting six times per driving wheel revolution instead of the normal four times.

[Reply to "P. B."]

Pressure Gauges.

Pressure-gauges are generally arranged with dials which exceed in range the maximum pressure at which the boiler is designed to work, but this is not to be taken as an indication that the boilers are ever likely to be worked at the maximum figure indicated on the dial, save when they are under tests.

[Reply to T. H. DONOHUE.]

Early Pullman Cars.

A number of the Pullman cars of early Midland days are now doing duty as line-side cabins for platelayers and others, those that you have seen near Manchester (Central) and Cheadle Heath, as well as others at Nottingham and elsewhere, being examples.

[Reply to "WILBRAHAM ROAD."]

The Whelley Loop, L.M.S.R.

We regret that we have no information either as to the past uses of the station at Whelley, now closed, or as to the existence of a passenger station, in years gone by, at Parkside, between Newton-le-Willows and Kenyon Junction. Possibly some of our readers can enlighten you.

[Reply to F. J. BUCKLEY.]

"Royal Scot" Class Locomotives, L.M.S.R.

The outside diameter of the boiler of the "Royal Scot" class 4-6-0 engines of the L.M.S.R. is 5 ft. 7⅜ in. at the first ring and 5 ft. 9 in. at the second. The diameter of the barrel taken over the lagging plates is 6 ft. 3 in.

[Reply to REV. J. S. CADDICK-ADAMS.]

Spring-balance Safety-Valves.

It was for many years the practice of the late Midland Railway to fit Salter spring-balance safety-valves above the domes of their engines, as auxiliaries to the usual safety-valves above the firebox, but the former are now removed as the engines come in for reboilering.

[Reply to "EMMA."]

L.M.S. Locomotive Classification.

The letters "5P4F" on the cab sides of the new 2-6-0 mixed traffic engines indicate that they are regarded as "Class 5" for passenger purposes and "Class 4" for freight haulage. We cannot give lists of engine names and numbers in these reply columns.

[Reply to "MOGUL."]

Seaboard Air Line.

We have no knowledge as to why this United States railway is so named, but assume that it is due to the fact that it serves a chain of coast resorts and has scenic attributes. It was certainly not so named in view of its ever having been worked on a compressed-air system.

[Reply to MEYNICK J. H. CRAMB.]

The 1925 Locomotive Exchange.

We believe that the actual exchange of the two engines for the purpose of these trials was made *via* Banbury, Leicester, Sheffield, and Doncaster, restrictions as to clearances and maximum weights over bridges preventing the use of any shorter route.

[Reply to W. E. M.]

Wirral Railway Locomotive Headquarters.

The locomotive headquarters of the Wirral Railway were at Birkenhead. We believe that a number of ex-Wirral locomotives are still in service, though not necessarily on their own section. Some have, however, been broken up.

[Reply to S. CANTRELL.]

Welsh Highland and Festiniog Railways.

These railways have not been amalgamated, but are worked under the same management and, to some extent, with engines and rolling stock in common. We have already been informed as to the situation at Pwllheli station.

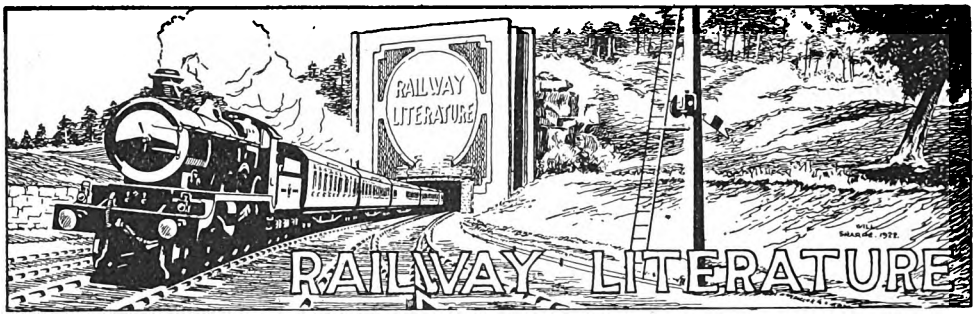
[Reply to "DDUALLT HALT."]

West Coast Expresses to Perth and Beyond.

If not calling at Motherwell, these expresses generally diverge from the Glasgow main line at Law Junction, and travel *via* Holytown to Mossend, where they rejoin the route *via* Motherwell, and thence *via* Coatbridge, Greenhill and Larbert to Stirling and Perth.

[Reply to "MOSSLEY HILL."]

Digitized by Google



First Special African Railway Number of *The Railway Gazette*. [Published by *The Railway Gazette*, 33, Tothill Street, S.W.1. 104 pp., with 138 half-tone illustrations and 26 maps and diagrams. Price 2s. 6d.]

This is the first of two special numbers which between them cover the whole of the railways of Africa. These numbers have been prepared with the co-operation of all the various railway administrations, and together, it is believed, form the most comprehensive survey of African railways ever published. The first number deals with South Africa and adjacent British territories, together with the Portuguese colonies Angola and Mozambique, as also the island railways of Madagascar, Reunion and Mauritius. The second number, referred to later, covers the rest of Africa, including Egypt and the Sudan, Kenya and Uganda, Nigeria, the Gold Coast and other territories.

The title page very appropriately bears an outline map of the Continent containing the motto "Semper aliquid novi ex Africa," of the truth of which the contents may be said to furnish chapter and verse. The *pièce de résistance* in this first number is naturally the special article describing the transport system of the Union of South Africa, to which pride of place is given. This article alone occupies 27 pages, and covers every branch of the great railways and harbours organisation, which, since the Union, has been operated as a single entity. It comprises railways, harbours, road motors and many auxiliary services, and operates 12,300 route-miles of line, mainly single track. The article describes how the system was built up, its organisation, and methods of operation. A separate editorial article, as is fitting, is devoted to an appreciation of the life work of Sir William Hoy. A very interesting feature of the editorial pages is a full-page general map of the African continent, showing territorial divisions, and showing also in the corner a tiny black thumbnail sketch, which turns out to be a map of England and Wales drawn to the same scale.

The island railways of Africa comprise the French railways in Madagascar and Reunion, 510 miles in length, and the British system of 144 miles in Mauritius. These are briefly described and illustrated. Next in importance to the South African system come the Beira and Mashonaland and Rhodesia Railways. This system comprises 2,462 route-miles of line, is owned by six companies, and runs through five distinct territories. The article fully describes the system and organisation.

The other articles describe the Shire Highlands Railway, the Central Africa and the Trans-Zambesia railways, all three systems being operated together by the same personnel; the Tanganyika Railways, a Government system, over 1,000 miles in length, and comprising two detached main lines; and the railways of Portuguese Africa, namely, the Lourenço Marques, Mozambique, Quilimane and Inhambane lines in Portuguese East Africa, and the railways of Angola, about 1,000 miles in length, divided into four separate systems. The principal line is the Benguella Railway, which on completion will form part of the East-West transcontinental route.

All these articles contain maps of the systems described, and illustrations in the text where necessary, but undoubtedly the special feature of the number is the art section of 52 pages, and containing 138 half-tone illustrations in all. This section gives a series of typical views of the railways described in the text, carefully selected from hundreds of photographs supplied from official sources, and forming in itself a valuable pictorial record of African railways. The views illustrate passenger and goods stations, track, bridges, signalling, locomotives, rolling-stock and equipment, and depict many typical scenes on the various railways.

The whole number is admirably arranged to enable the reader to form a clear view of the railways of the sub-Continent, and furnishes an important and permanent record of the work which they are doing in extending civilisation and opening up the resources of a vast continent whose

Digitized by Google

great potentialities are yet only dimly realised.

SECOND SPECIAL AFRICAN RAILWAY NUMBER OF *The Railway Gazette*. [Published by *The Railway Gazette*, 33, Tothill Street, S.W.1. 112 pp., with 140 half-tone illustrations and 20 maps and diagrams. Price 2s. 6d.]

Whereas the First Number deals with the railways of Southern Africa, practically only one-quarter of the whole area, the present Number covers the whole of the rest of Africa, and as it covers three-quarters of the area, is naturally more varied in character. All the African railways north of Angola, Rhodesia and Tanganyika receive attention in the Second Number; and these are very diversified in type and surprisingly extensive in the aggregate. Editorial notes and articles deal with the railways of Africa from every aspect, with railway life in tropical Africa and with trans-continental routes. Then follow the special articles describing the various railway systems, compiled in each case with the active co-operation and official approval of the responsible Administrations.

The most important system described is naturally that of the Egyptian State Railways, operating over some 2,000 route-miles of line, mainly on the 4-ft. 8½-in. gauge, and administered together with steamer services on the departmental system. Very satisfactory results have been achieved during recent years and a progressive policy of extension is being followed. In the Egyptian Delta is an interesting system of light railways extending over 600 miles, belonging to a British company, and serving principally to develop the agricultural districts of the Delta. Forming, as it were, a pendant to the Egyptian system, and steadily expanding in importance, we next come to the Sudan Government Railways and steamers. The State Administration controls 1,728 route-miles of 3-ft. 6-in. gauge line, operates steamer services over 2,435 miles of river, and has recently introduced mechanical road transport in certain localities. Important developments are pending in each phase of activity.

Amongst other systems, special articles describe and illustrate the Nigerian Railway, which extends for about 1,500 route-miles, linking up the interior with the ports of Harcourt and Lagos, and showing a highly satisfactory operating ratio of 59·20 per cent.; the Gold Coast Railway, the first section of which was not opened until 1901, and which now comprises nearly 500 route-miles; the Kenya & Uganda Railway, a metre-gauge line approximately, 1,000 miles in length, and known as the "World's Wonder Line"; and the Sierra Leone Railway, a 2-ft. 6-in. gauge line, extending for 338 miles. Further articles describe the various State and private railways of Tunisia, Algeria and Morocco, and review railway development in the Congo, the French Sudan, and French Equatorial Africa. In a separate article an Anglo-African correspondent recounts the various steps taken towards realising Cecil Rhodes's dream of railway communication between the Cape and Cairo. Italian railways in Africa, and various smaller projects, also receive adequate attention.

As in the First Number, a special feature of this issue is the art supplement of 56 pages, containing 140 half-tone illustrations of all the railways described and of the principal African Railway officers. Biographies of these gentlemen are also given, and the Number concludes with a useful directory of African railways.

Grateful acknowledgment is tendered to all those in Africa and England who helped to make these Special Numbers such a complete and comprehensive survey of the railways of Africa.

THE BOOK OF THE RAILWAY. By J. R. Hind. [Published by W. Collins Sons, & Co. Ltd. Price 6s. net.]

The author of this, the latest addition to the growing series of popular books dealing with railway and locomotive topics, is Information Agent to the L.N.E.R. at King's Cross, and, both in this capacity and privately, has more than once contributed to the pages of THE RAILWAY MAGAZINE. The general idea of the book corresponds more or less with that of other publications of the same class which have been reviewed in these pages, in that it is designed to provide interesting and instructive information for the general, and, in the main, the junior reader. It is in three sections, though, unless it is intended to issue the sections as separate publications, as has been done in one or two other instances with corresponding publications, we do not quite follow the reason for starting each section with a new Chapter I, especially as the page numbers run on continuously throughout the volume. The three sections deal, respectively, with "The Locomotive," "Trains, Stations and Track," and "The Railways of the World." Altogether there are 26 chapters, while the 384 pages, with 20 plates in colour and a large number of photographic views, sketches, &c., combine to produce a volume which will, no doubt, be read with interest by large numbers of our readers, as well as others who may receive presenta-

Digitized by Google

tion copies at Christmas or on birthday occasions. Although the author is associated with one of the four big railways, the book is written on an impartial basis, and a very fine collection of illustrations has been gathered together in regard to all the British railways, as well as those in other countries, including a number of views which are not generally familiar. Some will, however, be recognised by readers of THE RAILWAY MAGAZINE, in that several have been reproduced by arrangement with this publication and with *The Railway Gazette*. The text is interestingly written, and much useful information is included, though, obviously, the author could not do more than touch upon many matters of interest. While generally expressing appreciation, we cannot help noticing that Chapter III of the locomotive section, entitled "Some Famous Modern Locomotives and their Speed Records," appears to be mainly concerned with notable running in the past, and by engines which certainly do not now rank as modern. Some of the pictures, too, suffer from the fact that the illustrations, other than the plates, being on ordinary paper, do not come out quite so well as would have been the case had it been practicable to use paper of an art quality. In general, however, this book can be cordially recommended.

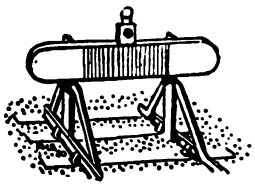
THE MODEL RAILWAY HANDBOOK. By W. J. Bassett-Lowke. [Published by Bassett-Lowke Limited, Northampton. Price 2s. 6d.]

This new edition, the eighth of this well-known publication, while retaining most of the usual characteristics, has been entirely rewritten and brought up to date, while many new photographs and other material have been added. Chapter I deals with the planning of model railways and the choice of scale, gauge and motive power, and succeeding chapters with clockwork, steam and electric locomotives, rolling-stock, track, signals and signalling, stations, accessories, &c. The concluding chapter gives some practical hints on the manipulation of model railways. The book is interestingly written and has many fine illustrations, a number of which indicate how closely views of model railway scenes can be made to suggest the real thing. Numerous diagrams and drawings are also included. As the book is well produced, and, beyond the fact that it describes a number of productions of the firm responsible for its publication, does not suggest a price-list or an ordinary catalogue, it is quite appropriate for a place on the shelves of a railway library. In addition, it contains much useful information and many practical hints for those directly interested in model railway work. Readers of both classes can, therefore, be recommended to purchase copies.

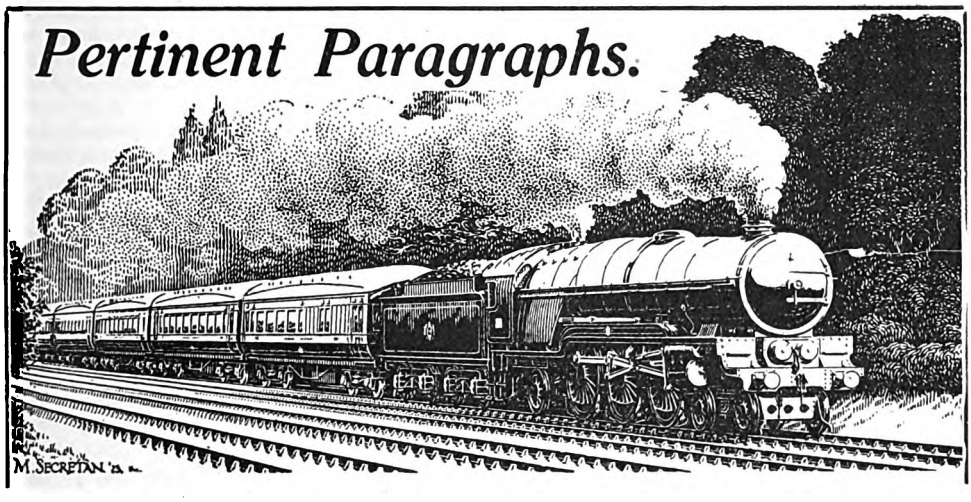
THE RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY, BULLETIN No. 14.

This *Bulletin*, like its predecessors, includes quite a number of articles and other material of great interest, with many notable illustrations. Thus we find two historic locomotives at Purdue University described; Mr. J. W. Smith deals with some early Scottish 4-4-0 locomotives; Mr. C. S. Given writes on the Grand Trunk Railway of Canada, and other articles deal with an old Michigan Central engine still in service, and the history of the Schenectady Locomotive Works. English readers desirous of information concerning the Society or wishing to obtain copies of the *Bulletin*, should communicate with Mr. G. W. Bishop, 57, Warwick Road, Kenilworth, Warwickshire.

BASSETT-LOWKE Limited, of Northampton, send copies of new catalogues "A" and "S," dealing respectively with model railways and scale models. Copies of either can be obtained from the firm, post free 6d. each. Both have been extensively revised and among the new lines included are the following: *Duke of York* locomotive, especially designed for the B.D.V. gift scheme; new 0-6-0 six-coupled L.M.S. and L.N.E.R. goods engines in both clockwork and electric; new *Junior Permag* electric traction motor; switch and controller for electric railways; and modern coaching stock in wood, suitable for amateurs to paint and fit up, etc.



Digitized by Google



Southern Railway's Trade Advertising Activities.

In connection with the Southern Railway Company's new trade advertising activities, we have received specimen copies of the first posters issued by its Advertising Department, which are partly pictorial in character and partly letterpress. As regards design, colouring and printing the new posters are all that could be desired and well calculated to attract the attention of prospective advertisers. "Keep your sales up! by persistent advertising on the Southern Railway" is the legend occupying the lower half of one poster—the word "sales" in this connection obviously being a play on the swelling canvases of an old-time sailing vessel—in orange red and black—which occupies the upper half of the poster. The letterpress beneath is printed in blue and black ink, and has an exceedingly neat appearance.

The second poster stresses the fact that "The Permanent Way to Profitable Advertising is on the Southern Railway"—a happy conceit which will doubtless be appreciated by all who see it. In this case the pictorial section shows the figure of Mercury—here typifying Publicity—astride a winged wheel running on a permanent way. Red, blue, green and black are the colours used in this drawing, the accompanying letterpress being in red and black only, while a neat thin border of green and blue encloses the whole.

A small six-page folder is also issued in connection with the new advertising scheme. Its first page is a reproduction in little of the aforesaid "sales" poster, and the clearly-printed letterpress which follows is well written and makes a strong appeal to the likely advertiser.

Railway Catering.

At the thirtieth Universal Cookery and Food Exhibition, Holland Park Hall, London, on Saturday, November 19, at 5 p.m., Mr. George Woodhouse, L.N.E.R., and Mr. P. S. Robinson, G.W.R., with attendant railway chefs, gave a demonstration of restaurant-car cooking and catering by preparing a sample table-d'hôte dinner within four posts representing the confined space of a travelling railway kitchen. Mr. Woodhouse explained the enormous recent development of railway catering, recalling that the Great Northern Railway introduced the first railway-catered restaurant car in the world, between King's Cross and Leeds, in 1879, when a supplementary charge was made above the first-class fare. The lighting was by oil, cooking was by coal, and there was no heating apparatus. In cold weather, travellers were glad of the iron foot-warmers. He said that frequently 400 meals are now served between King's Cross and Edinburgh in restaurant cars, which can serve 78 passengers at the same time, and are accessible by all passengers through the corridors. The L.N.E.R. now operate eight all-electric kitchens equipped with full cooking ranges and refrigerators, the current for which is generated by the motion of the trains supplemented by accumulators to enable cooking operations to be continued during intermediate stops.

Mr. F. G. Lake, pattissière, Great Western Royal Hotel, Paddington, won two silver medals; Mr. J. Fillion, chef at the same hotel, was awarded a bronze medal; and Mr. J. W. Vowles, restaurant-car cook, secured a certificate of merit. "These successes are notable from the railway point of view," said an official of the G.W.R. to a Press

Digitized by Google

Association representative, "because the competition was open to chefs throughout the country, of any nationality. The exhibit of Vowles was cooked in a patent steamer of his own invention, which is being tried out on the company's restaurant cars."

Railway Bills in Parliament.

THE chief interest in railway promotions for the ensuing Session of Parliament centres in the Bills and Orders which are to be promoted by the four amalgamated companies and the Metropolitan Railway Company for road transport powers. These proposals, which are similar in each case, are put forward separately in order to comply with Standing Orders.

As set out they are of the widest possible description, enabling each railway company to "provide, own, work and use road vehicles to be worked by animal, electrical, mechanical or other power for the conveyance of traffic of all descriptions, and to demand, take and recover fares, rates and charges in respect of traffic so conveyed." The companies will ask for power to acquire lands and buildings and erect depots, &c., and to make and enforce bye-laws for the purposes of such traffic. They also seek power to enter into agreements with any local authority, company, body or person with reference to the working, user and supply of road vehicles, and to use their funds for road traffic purposes. Apart from road transport there are three other railway promotions, two by the London Midland and Scottish and one by the Great Western. These are mainly of local interest, though extended powers of dealing with lands are proposed to be taken by the L.M.S.R. Company's Bill and Scottish Provisional Order.

A Comprehensive "Slip."

A CORRESPONDENT has written to draw our attention to the remarkably extensive scope, in the way of connections, of the slip portion which is detached daily at Didcot off the 11.15 a.m. down Bristol two-hour express. This slip was only instituted in May of last year, and was put on primarily to give a fast mid-morning service from London to Oxford. Actually the through coaches serve Culham, Radley and Oxford, with connections from Radley to Abingdon, and from Oxford to Banbury and all stations thence to Leamington. At Didcot connection is given westwards to all stations between Didcot and Swindon, and from there onwards to all stations between Swindon and Filton Junction, *via* Badminton, and stations between Dauntsey and Bathampton, not to mention the Farringdon and Malmesbury branches, stations between Swindon and Cirencester, and Melksham and Holt, none of which could be reached at the same time or earlier by any later departure from Paddington. To complete the list, there is connection at Didcot to Newbury, including all intermediate stations on the D.N. & S. line. In most of these cases the slip offers an acceleration of 30 minutes on the previous times from Paddington, by the 10.45 a.m. down semi-fast to Bristol, which the 11.15 a.m. overhauls at Didcot. Our correspondent remarks that he knows of no other slip, either in past or present railway history, giving connection to such a multiplicity of different stations and directions, and it is not surprising that the 11.15 a.m. down required on several occasions last summer to be stopped at Didcot, the weight of the slip portion making it inadvisable to detach in the ordinary way. Recently, on the other hand, two regular Great Western slips have been replaced by stops. Attention has already been directed to the Kingham stop of the 12.45 p.m. down, breaking into the last remaining non-stop journey to Worcester, and designed, it is understood, to give passengers for the Cheltenham direction access to the restaurant car. Now the Westbury slip of the 1.30 p.m. West of England train goes by the board, the stop affording an excellent connection from Oxford, Chippenham and elsewhere to the West, off the 11.30 a.m. from Birmingham to Weymouth.

Level-Crossing Responsibility.

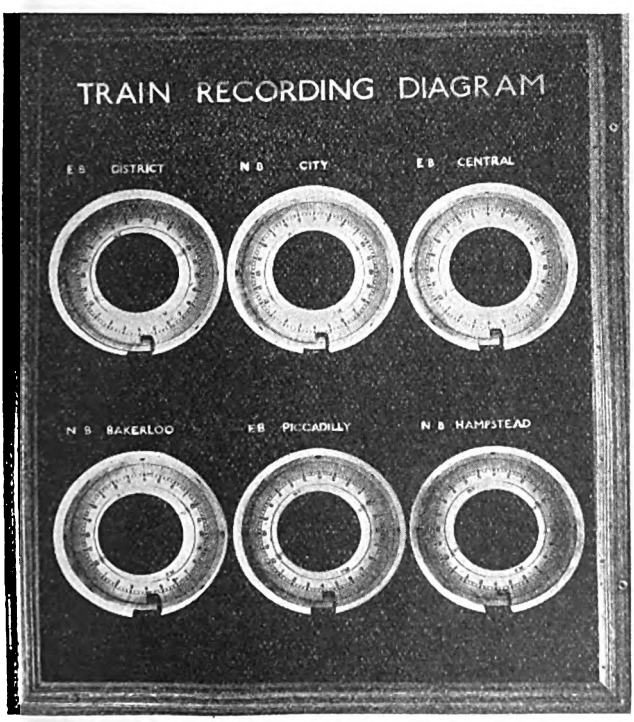
IN view of the divided opinions which seem to be held in certain quarters, and bearing in mind the seriousness of the level-crossing situation in the United States, it is interesting to find that a very definite and unmistakable decision has been given by the United States Supreme Court. This decision is very well summarised in the following terms :—"When a man goes upon a railroad track, he knows that he goes to a place where he will be killed if a train comes upon him before he is clear of the tracks. He knows that he must stop for the train, not the train for him." This makes it quite clear that the ruling principle must be that road traffic crosses railway tracks, when unprotected, at its own risk, and that the onus is upon the road user and not upon the railway to ensure the safe passage of road traffic. In the case of protected level crossings, it may be argued that the provision of gates, or the presence of a watchman or other railway employee, carries the inference that in such instances the railway company accepts the implied responsibility, though even then there might be material circumstances which would alter the situation. The judgment in question seems, how-

Digitized by Google

ever, to settle, in unmistakable terms, an issue of considerable importance to American railways, and one also of interest to railway officers in many parts of the world.

Train-Recording Clocks at "Underground" Headquarters.

ONE of the chief difficulties connected with the operation of underground railways is the quick dissemination of news when some mishap occurs, so that those best able to deal with the mishap can come to the spot quickly and make the necessary arrangements. Quite recently six recording clocks have been installed in the entrance hall to the "Underground" General Offices. Separate clocks are provided for each line (District, "Bakerloo," "Piccadilly," "Hampstead," Central London and "City"). The faces of these clocks consist of paper dials covering 24 hours, and are connected up electrically with a contact lever on the track. The passage of an individual train past a given point makes an electrical contact which causes a small inked hammer to stroke the fringe of the dial. The dial itself rotates at the equivalent speed of a clock, and, as the hours go by, the fringe reveals a number of fine markings. These, if equidistantly spaced, show that the trains are running to schedule. The dial makes a complete revolution in the 24 hours, and a record of the whole day's working is thus obtained. If, however, the service is not working smoothly, gaps appear upon the dial. The dial itself affords no explanation of what has occurred. It is, therefore, proposed to instal in conjunction with the clock a machine which will set out particulars of the incident causing the derangement, stating where it is and what has occurred, and what changes are necessary to correct it. These news-recording instruments will be installed at all the depots so that the engineering and operating staff will be advised at once, and simultaneously, of the occurrence. They will be operated from the control offices at Leicester Square for the tube railways and at Earl's Court for the District Railway. By this means it is hoped to mitigate any delay which may follow from a mishap and to improve the standard of operations upon the railways as a whole.



"UNDERGROUND" TRAIN RECORDING CLOCK.

Woodside and South Croydon Section, Southern Railway.

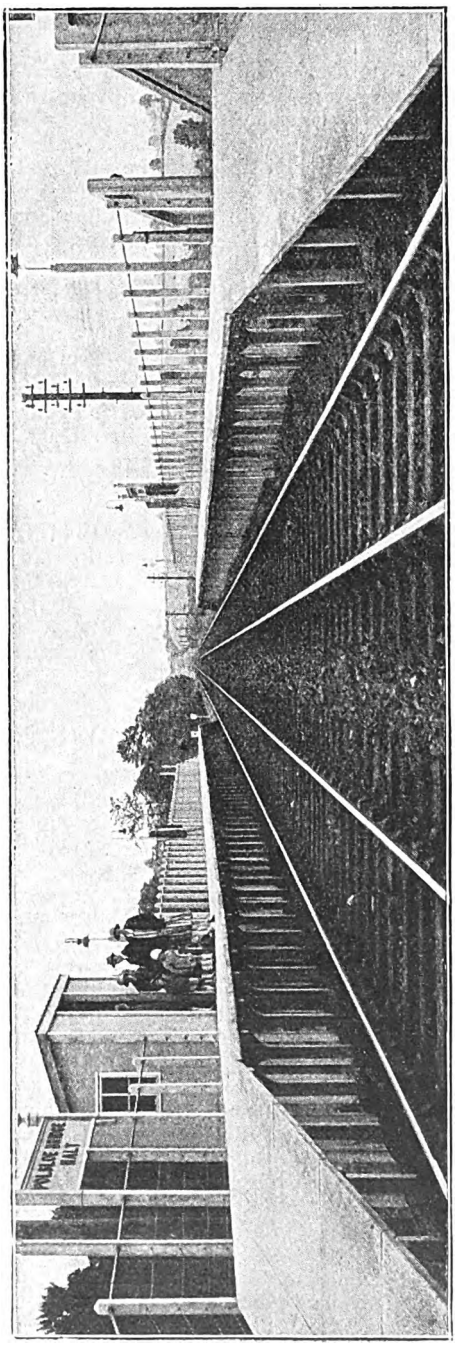
COMMENTING upon some remarks (recently quoted) by Mr. G. T. Moody, Mr. G. L. Grundy points out that this section of line has been relaid throughout, and during the past summer was extensively used by trains from Hastings to Cannon Street or Charing Cross. These trains travelled *via* Tonbridge, Edenbridge, Oxted, Selsdon Road, the Woodside and South Croydon Railway, the Mid-Kent line and Ladywell, rejoining the main line at St. John's. The distance by this route is fully 70 miles, but, of course, it is comparatively free from traffic. On August Bank Holiday trains left Hastings by this route at 4.45, 6.45, 6.55, 7.15 and 7.36 p.m., reaching Selsdon Road at 6.26, 8.23, 8.30, 8.57 and 9.17, respectively.

Mr. Grundy adds some further remarks, which may be quoted as follow: "An interesting point in connection with the Brighton excursions from Lewisham is that, while they reach Brighton *via* Ardingly and Haywards Heath, they usually return by Lewes and Barcombe. Construction appears to have been started on the Wimbledon to Sutton Railway at a point about half a mile from Wimbledon, at the Raynes Park end of the goods yard. A short length of embankment is finished and a short branch line has just been laid in."

Digitized by Google

Ferro-Concrete Station Construction.

DURING a recent visit to the large Southern Railway depot at Exeter known as the Exmouth Junction Depot—which has been and is now undergoing complete remodelling and considerable extension—we were much interested in a nearby station and halt constructed entirely in ferro-concrete. The station referred to is known as Polsloe Bridge Halt, and is situated about 1¼ miles from Queen Street station, Exeter.



POLSLOE BRIDGE HALT, NEAR EXETER, SOUTHERN RAILWAY.

From an examination of the photograph reproduced it will be seen that the reinforced concrete slabbing forming the surface of the platforms rests on direct concrete brackets, which are particularly light and simple in design, and that by extending the back legs of these brackets up above platform level they have been made to serve in addition as the posts for the fencing along the back of the platforms.

The railway at the halt is on a high embankment, and the design in question was adopted on that account. Access to the platforms from the public road below is gained by concrete staircases; there is a small combined shelter and booking office, also in concrete with asbestos roofing, on the down platform, and a concrete name board with white concrete letters on a black background is provided on each platform.

The whole of the component parts required in the construction of the halt were pre-cast in the company's large concrete construction depot nearby, and erected under the supervision of the Western Divisional Engineer, Mr. W. H. Shortt, M.Inst.C.E. In conclusion, we have to thank the Chief Engineer, Mr. G. Ellson, M.Inst.C.E., for particulars utilised and for the photograph from which the accompanying illustration is reproduced.

Conveyance of Milk in Glass-Lined Tanks.

IN conjunction with the United Dairies (Wholesale) Limited, the Great Western and L.M.S. Railways recently placed in service glass-lined tanks for the conveyance of milk in bulk by passenger train or other similar service. Their introduction heralds the inauguration of an entirely new method of conveying liquid milk by rail in this country, and in substituting the old-established system of conveying milk in churns, may lead to a complete reorganisation of milk transportation arrangements.

The tanks are fixed on steel undercarriages, being embedded in saddles lined with Ferodo, and are well insulated as a precaution against an abnormal increase in temperature of the liquid, especially during hot weather. An empty tank of 3,000 gallons' capacity, together with the undercarriage, weighs approximately 11 tons, so that when filled the gross weight amounts to approximately 24 tons. The volume of milk conveyed in this manner would require the provision of three vans if contained in ordinary milk churns. Tanks

Digitized by Google

of 2,000 gallons' capacity will also be brought into use.

Progress in the development of this new system of conveying milk in bulk will be watched with interest, having regard to the many novel features involved.

New East Coast Railway Opened in Sweden.

THE East Coast Railway, a new and more direct route to the great Northland, connecting Stockholm with a number of flourishing northern cities along the Swedish coast, affording much-needed transport facilities to many industries as well as opening up picturesque and historically interesting districts for tourist traffic, has just been ceremoniously opened by the King of Sweden. The prosperous and industrially important cities of Gaevle, Soederhamn, Hudiksvall, Sundsvall, and Hárnosand have now been brought many hours nearer to the Swedish capital, and the inhabitants of these cities enthusiastically celebrated the memorable event.

The line now opened for traffic is 301 km. long and has been constructed under considerable difficulties. Construction work was begun in 1916, and the financial support of the Government was assured by the Riksdag in 1923. About forty bridges had to be built across the many rivers of the north, and considerable cutting and blasting work had to be performed, one of the cuttings being the biggest in Sweden, involving the taking out and removing of 104,000 cub. m. of earth and rock. Locomotives and freight cars have been purchased from the Swedish State Railways, and the passenger coaches have been taken from Swedish and German works.

The passenger travelling from Stockholm first uses the Stockholm–Upsala–Gaevle line and enters on the new East Coast line at Gaevle. On his way he passes a number of Sweden's biggest industrial plants, including the large sawmills of Skutskaer and the iron works of Ljusne, Axmar, and Iggesund. The traveller also passes through some of the most grand and picturesque scenery of the north. When the King passed through these districts on his special train he received an enthusiastic ovation from the local population, who assembled at every station along the road.

Can the Electric Locomotive be Interesting on its Own Account.

REFERENCE was made in the November number to the address given by Mr. J. F. Gairns, Editor of THE RAILWAY MAGAZINE, to the Wimbledon and District Model Railway Club on October 3, and to the fact that prizes were offered for the best two short essays on the subject. A number of entries were received, and Mr. Percival Marshall, Editor of *The Model Engineer*, and of *The Model Railway News*, kindly acted as judge. The prizes were allocated, one to Mr. R. Curzon England, and the second to Mr. C. J. Grose. There were, however, quite a number of other essays which could be regarded as good, although they had to give place to those of the gentlemen mentioned so far as the allocation of prizes was concerned. As the subject is one in which, no doubt, many of our own readers will be interested, the two prize essays are reproduced below.

Mr. England's Essay.

"Can the Electric Locomotive be interesting on its Own Account?" Yes, obviously it can. All machinery requiring scientific thought, whether electric or otherwise, must be interesting. But "Can the Electric Locomotive be as Interesting as the Steam Locomotive?" is a very different question from the one upon which Mr. Gairns really built his lecture to the Wimbledon Club.

Railways, taken on the whole, are extremely interesting in almost any of their many departments, and from the purely scientific point of view there seems to be little to choose in interest between electricity and steam, both being highly specialised subjects with much room for originality of design and improvement.

But to the world in general it is very different. To the casual passer-by and to all children, as well as to most ordinary railway devotees themselves, it is the steam locomotive that attracts attention—and that keeps 90 per cent. of it. Could the electric locomotive do that if it were as common as the steam engine?

At the beginning it must be admitted that appearance is a vital factor to most people's appreciation. In performance speed also enters into it, but to the average not over-technical enthusiast such things as coal or current consumption and maintenance costs have little effect on his admiration.

There are many who never think of a railway, yet who will stop to admire an express engine waiting in steam at the head of its train. Does anyone usually stop to gaze at a shunting engine or a steam rail-motor in coach livery, or spend admiration on an electric suburban set?

No, they are not attractive enough, and have not the impression of power. And electric locomotives, however powerful thay may be, however neatly finished, fall into the same class. To most people their outline is not unusual enough, not artistic enough, and they give too much the idea of a "coach with works."

That the steam engine is in a casing with almost everything of importance covered or concealed is true, but that casing, unlike the electric version, is made up of rounded shapes and varying artistic lines which have an unusual appeal and fascination of their own. And undoubtedly the steam itself adds a picturesqueness and softness, which, combined with its hiss and roar, must aid in giving that impression of power of which the steam engine is so typical.

But, above all, the steam locomotive is *individual*, and its individuality shows and

Digitized by Google

changes and pleases in almost every type and every detail. When an electric engine is rebuilt its general appearance is seldom very different: but change only the funnel of a steam engine and its whole character is altered.

While steam maintains the attractiveness and personality it has always had in Britain, it must keep, and not share, the affection of almost all.

Mr. Grose's Essay.

The title of Mr. Gairns' lecture was given as "Can the Electric Locomotive be Interesting on its Own Account?" To this the answer is, unquestionably, "Yes." But the lecture itself was based on comparison with steam locomotives, and the question really was, "Can the Electric Locomotive be as Interesting as the Steam Locomotive?"

My answer to this is, "No." In my opinion, the electric locomotive will never be as interesting as the steam locomotive, because the steam locomotive is a self-contained prime mover, whereas the electric locomotive, is simply an electric motor plus any necessary starting gear, and, perhaps, transformers. Owing to this difference, a steam locomotive will always have many more points of interest than an electric locomotive. Admittedly, electric motors and starting gear are not without some interest, but on an electric locomotive little or none of these is to be seen. The lagging on steam boilers does not disguise their relative sizes, but the superstructure of an electric locomotive bears no relation whatever to the horse-power of its motors.

Few people find any interest in watching an electric motor at work, but many are fascinated by a generating station. The steam locomotive is "generating station plus electric motor," only in a much more interesting form by reason of the agent (steam) employed. There is little to *see* in a motor or dynamo at work; and that which appeals most to the greatest of the five senses is most likely to create the greatest degree of interest.

The Stephenson Locomotive Society.

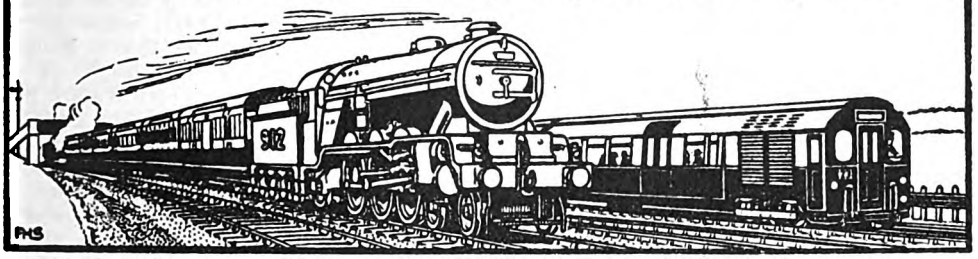
THE annual dinner of the society was held on Saturday, December 3, at the Holborn Restaurant, under the chairmanship of Mr. J. N. Maskelyne. There was a good attendance and a pleasant evening was spent. Mr. L. E. Brailsford proposed the toast of "The Visitors," to which Mr. W. G. Pape, Indoor Assistant to the General Manager of the Southern Railway, replied. Mr. G. H. Taylor proposed the health of the society, to which Mr. Maskelyne replied; Mr. R. A. H. Weight, that of "The Railway Press," to which Mr. J. F. Gairns responded; Mr. H. J. Brough, that of "The Branches," to which Mr. W. H. Whitworth replied; and Mr. F. H. Smith, that of "The Locomotive Running Departments," to which Mr. H. G. Bostock and Mr. J. Smellie responded.

Cultivating the Travel Habit in India.

THE efforts made by various Indian railways to cultivate the travel habit among the teeming millions in that corner of the globe have been chronicled and commented upon from time to time in these pages. Yet another example came to hand recently from our Calcutta correspondent, who describes how, through the enterprise of the Eastern Bengal Railway authorities, some 600 villagers resident on their system were recently enabled to visit Calcutta, when the worship of the goddess Kali was celebrated at Kalighat. The E.B.R. scheme for running a third-class conducted excursion train to Calcutta has already been mentioned in these columns. The pilgrims were detrained at Sealdah station in the early morning and conveyed to Kalighat in tramcars. After bathing in the sacred river, they visited the temple and offered puja to the goddess. They then roamed about the shops making purchases, and after the midday meal—arranged by the railway authorites—the pilgrims were taken to the Museum and thence to the Zoo. Subsequently they were entertained at a cinema exhibition at the Railway Institute at Sealdah. Dinner was next provided, after which the happy pilgrims entrained for home and next morning found themselves back in their respective villages "wondering" to quote our correspondent, "if their experiences of the previous day were real or merely a hallucination." In this connection, credit is given to Mr. A. K. Gupta, the Railway Publicity Officer, for the successful way in which the trip was organised and carried out at a ridiculously low cost to the delighted excursionists. As the result of the tour, it is anticipated that future excursions will be even more successful and eventually become a regular source of income to the railway.

Digitized by Google

WHAT THE RAILWAYS ARE DOING.



Mr. William Whitelaw, Chairman of the London & North Eastern Railway Company, presided at a largely-attended concert held in the Usher Hall, Edinburgh, under the auspices of the Edinburgh and District Branch of the National Union of Railwaymen's Orphan Fund Committee on November 9.

* * *

Mr. Frederick George Evans, C.B.E., who has been appointed Secretary, London Midland & Scottish Railway, in succession to Mr. R. C. Irwin, has held the position of Chief Stores Superintendent since January 1, 1925. He commenced his business career in the printing works of McCorquodale & Co. Ltd., whence he went to the London, Edinburgh & Glasgow Assurance Company. He entered the service of the London & North Western Railway Company in the Audit Office, on December 13, 1886, and became the Audit Accountant of that company on January 1, 1915. Mr. Evans was appointed Audit Accountant of the new London & North Western Railway on January 1, 1922, and of the London Midland & Scottish Railway upon the amalgamation under the Railways Act on January 1, 1923. He was made Chief Stores Superintendent on January 1, 1925. Mr. Evans served as a member of the War Office Railway Financial Commission in France, in connection with which he received the Commandership of the Order of the British Empire in 1920. He also served upon the Accountant's Executive Committee in the working of the agreement with the Government for the control of the railways during the Great War, and has been Chairman of the Railway Clearing House Accountant's Standing Committee.

Photo.] **MR. F. G. EVANS, C.B.E.,** [*Topical.*

Appointed Secretary, London Midland & Scottish Railway Company.

Digitized by Google

MR. W. A. REE,
Appointed Chief Stores Superintendent, London Midland & Scottish Railway.

THE name of Mr. Nicol Campbell, M.B.E., Superintendent, Carlisle Citadel Station Joint Committee, has been added to the Commission of the Peace for the City of Carlisle.

* * *

WE regret to record the death of Sir Arthur Francis Pease, a Director of the London & North Eastern Railway Company, and of the Forth Bridge Railway Company.

* * *

MR. WALTER ALEXANDER REE, who has been appointed Chief Stores Superintendent, L.M.S.R., has held the position of Goods Operating Manager since early in 1924. Educated at Rossall School, he entered the service of the London & North Western Railway Company in September, 1892, in the Goods Department at Waterloo, Liverpool. After holding various positions he was appointed District Traffic Superintendent at Swansea in January, 1906. In January, 1909, he took up the position of District Goods Manager at Wolverhampton, which position he held until August, 1911, when he was appointed Outdoor Goods Manager for the Southern Division, in succession to Sir Herbert Walker (then Mr. H. A. Walker). The Southern Division Outdoor Goods Manager's office at that time was removed from Euston to Birmingham. In 1912 Mr. Ree took up the position of Outdoor Goods Manager for the Northern Division at Exchange station, Manchester, but returned to Euston as Outdoor Goods Manager for the Southern Division in June, 1913, which position he held until, as a result of the retirement in 1920 of Mr. W. J. Chipman, he was made Outdoor Goods Manager for the whole of the line. In January, 1922, he became Divisional Goods Manager for the Southern Division of the L.N.W.R., following the amalgamation of the L.N.W. and L. & Y. Railways, and continued in a similar capacity under the L.M.S.R. until, in 1924, he was appointed Goods Operating Manager for the entire system, as above mentioned.

* * *

M. PIERRE DEFRANCE, delegate in London of the Belgian State and

MR. F. TREASURE,
Stationmaster, Baker Street, Metropolitan Railway.
(*See article in December, 1927, number.*)

Digitized by Google

National Railways since 1894, was sent to England in that year by the Belgian Government (Railways Department) to organise an agency whose special mission was to develop traffic (passenger and goods) between the United Kingdom and countries overseas on the one part, and Belgium and other European countries in transit through Belgium on the other. Accordingly, for the last 33 years, the Belgian State Railways agency, established at 47, Cannon Street, has been conducted under the management of M. Pierre Defrance. During the difficult period of the war M. Defrance did yeoman service in the interests of his country. Among many other services, he was entrusted by His Excellency the Belgian Minister of Railways with the task of looking after the Belgian railwaymen who took refuge in England. M. Defrance was also appointed by the Belgian Government during the war a Belgian member of the Anglo-Belgian Trade Committee which was formed by the British and Belgian Governments to prepare the way to re-establish and develop trade connections after the war. In recognition of his excellent services M. Pierre Defrance received the Order of the British Empire from the British Government.

* * *

M. A. Mertz, who for the past four years has been assistant to M. Defrance in London, and who has been appointed his successor as representative in London of the Belgian

M. A. MERTZ,

Appointed London Representative, Belgian National Railways.

M. P. DEFRANCE,

London Representative, Belgian State and National Railways, 1894–1927.

National Railways, is a Licencié en Sciences Commerciales (B.Com.), an officer of the Reserve of Engineers in the Belgian Army, and was employed for five years at the Central Administration of Railways in Brussels. During these five years he was able to get a sound knowledge of commercial and administrative work. During the four years he has been in England he has gained a thorough knowledge of the uses and customs of the large English markets, of the English railways, English firms who are interested in transport, shipping agents, travel agencies, shipping lines, exporters and importers, &c.

* * *

Mr. Ashley Edwards has been appointed to the position made vacant by the sudden death of Mr. Norman S. Rankin, special publicity agent, Department of Colonisation and Development, Canadian Pacific Railway, Montreal.

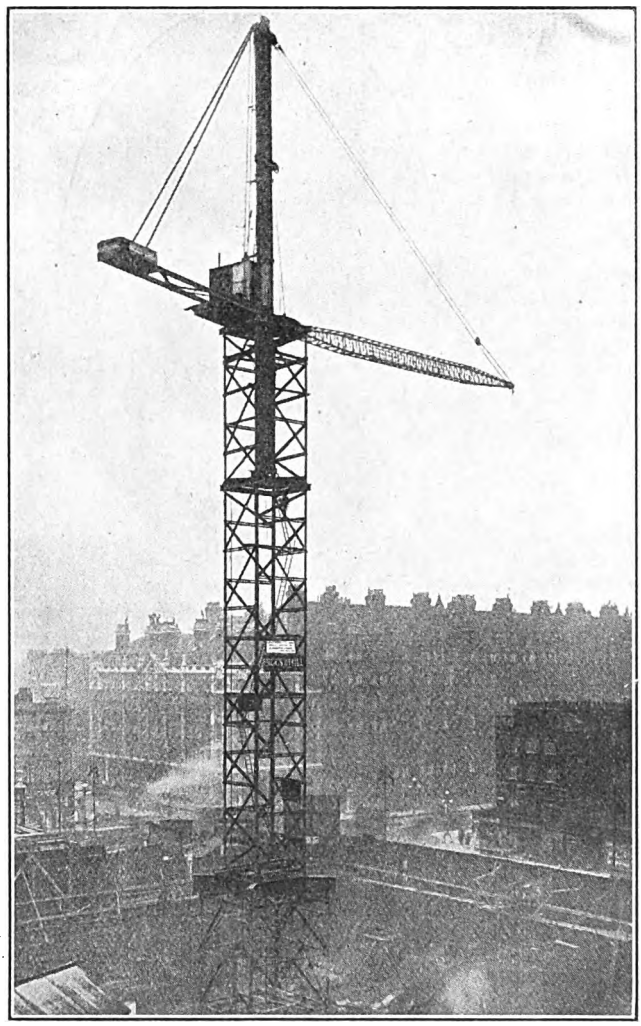
* * *

Mr. Richard Brown, Divisional Accountant, Scottish Area, London and North Eastern Railway, Edinburgh, has been appointed a Justice of the Peace for the County and City of Edinburgh.

* * *

The death is announced at the age of 76, after a long illness, of Mr. Charles R. Hosmer, a Director of the Canadian Pacific

Digitized by Google



BIG CRANE AT BAKER STREET STATION, METROPOLITAN RAILWAY.

Erected for use in the construction of new residential flats, &c.

Railway Company and of the Bank of Montreal. Mr. Hosmer entered the service of the Canadian Pacific Railway in 1886 as head of the Telegraph Department, and controlled the whole telegraph system of the line until his retirement in 1899.

* * *

THE Metropolitan District Railway has won the Railways Athletic Association silver Cup, presented by Sir Henry Thornton for the best all-round annual record, and the trophy was handed to that company's representative on November 15 by Mr. W. W. Sharp, Chairman of the General Committee of the Association. The total number of points scored by the District team was 57, the G.W.R. were second with 54 points; while the Southern Railway were third with 52 points.

* * *

PROVIDED for use in the erection of the new buildings at Baker Street station, Metropolitan Railway, a crane of an exceptional character has been installed. This is believed to be the largest of its kind in the world, is unique in many respects, and differs entirely from the usual type now well known to Londoners. It comprises a single "leg" nearly 150 ft. in height, and is surmounted by a steel lattice-work jib 100 ft. long. It is so constructed that when left at night unattended it will automatically rotate, in the manner of a weather vane, and so adjust itself to any adverse wind pressure that may arise. The area covered by the crane is over 30,000 sq. ft.

* * *

THE L.M.S.R. has made arrangements in a number of districts served by their system for delivery by motor from their stations to farms, generally within a five miles' radius, of such traffics as cattle feeding stuffs, grain, flour, &c., and for the collection of any suitable traffics which farmers may have to despatch by rail. Warehouses have also been opened at various distribution centres in which manufacturers hold stocks. From these, the farmers' supplies may be delivered from time to time in such quantities as may be required for immediate consumption when storage accommodation on the farm is limited. Particulars may be obtained from the Chief Goods Manager (Development Section), Euston Station, London.

* * *

THE first of three new twin-screw steamers which have been ordered from William Denny & Bros. Ltd. by the London Midland & Scottish Railway was launched at Dumbarton recently. The ceremony was performed by Lady Stamp, wife of Sir Josiah Stamp, Chairman and President of the Executive. Among those present were Sir Josiah Stamp, Sir Archibald Denny, Sir

Digitized by Google

Arthur Rose, Sir Alex. Gracie, Messrs. Morris and Jack Denny and the following officers of the L.M.S. Railway :—Mr. R. W. Reid, Vice-President ; Mr. E. F. C. Trench, Consulting Engineer ; Capt. Beasley, Marine Superintendent, and Mr. J. F. Gee, Chief Accountant. These vessels have been ordered for cross-channel service between Heysham and Belfast. Accommodation is provided for sleeping 308 saloon passengers in cabins and state rooms, also 104 steerage passengers. The vessels have a tonnage of 3,800 and a carrying capacity of 400 tons of cargo, 304 head of cattle and horses. The steamers will have a speed of 21 knots, length of 360 ft., and a breadth of 53 ft., and are furnished with twin-screw single reduction geared turbines of Parsons design.

* * *

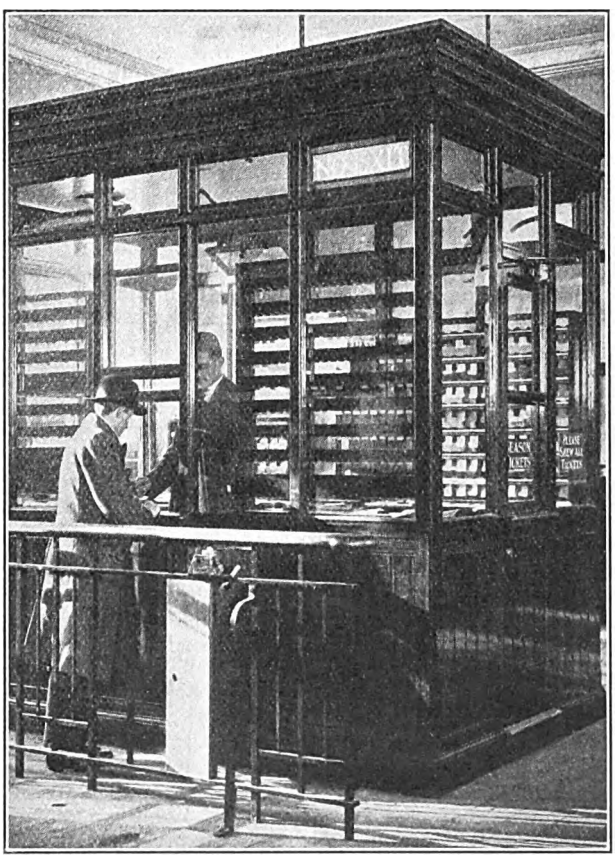
THE directors of the Southern Railway have authorised an expenditure of nearly £100,000 in connection with the reconstruction of the East Pier at Newhaven Harbour, and the work will, it is hoped, be completed in about two years' time. The contract has been let to a British firm. The new pier will follow generally the same lines as the existing structure, but owing to the special nature of the work it will be necessary to employ special pile-driving apparatus for the driving of piles and pile-shooting, while special travelling gantries will be erected for handling the materials required for the reconstruction work. The existing East Pier was constructed under the auspices of the Newhaven Harbour Company nearly fifty years ago.

* * *

THE L.N.E.R. has decided to open up two of the tunnels between Godley and Mottram stations on the main Manchester and Marylebone line. This has been rendered necessary owing to the increased dimensions of present-day rolling-stock and the need for four lines of rails on this busy section. The tunnels, which are 100 and 264 yards long, connected by an open cutting of 110 yards, are to be transformed into one continuous cutting by the removal of over 700,000 cub. yards of earth, which will be tipped on a site near the east end of the work. As the main road from Stockport to Glossop passes over the eastern-most tunnel, a 5-span brick and steel viaduct is included in the scheme. A contract has been placed with Logan & Hemmingway in connection with the work, which is to be commenced immediately.

* * *

COL. SIR J. W. PRINGLE'S report to the Ministry of Transport in regard to the collision which occurred on June 27, at Wimbledon, has been issued. The trains concerned were a Metropolitan District electric train from Earl's Court and a similar train leaving Wimbledon. Eight passengers were injured, four seriously, while two motormen and two guards received injuries, those of the motorman of the incoming train being of a serious character. The principal responsibility is placed upon the motorman of the outgoing train and on his guard, in that the motorman accepted the guard's



[*Topical.*

PASSIMETER BOOKING OFFICE AT MUSWELL HILL, L.N.E.R.

This is the first instance of a Passimeter Booking Office on the L.N.E.R., and is further notable in that enquiries and other sections of the general work of the station are dealt with, besides the issue and collection of tickets.

Digitized by Google

"right away" without assuring himself that the starting signal was off. The matter was complicated by the fact that under Southern Railway rules, the principal responsibility is placed upon the motorman, whereas under Metropolitan District Railway rules the responsibility is placed upon the guard for observing signals himself before instructing the driver to proceed.,

* * *

A VERY fine colour plate of the G.W.R. *King George V* locomotive, 24 by 8½ in. (with border, 29 by 16 in.), has been issued by the Great Western Railway. It shows with great accuracy of detail this now famous locomotive, and is beautifully printed, so that every interested reader should obtain a copy. The plate can be purchased from the Stationery Superintendent, G.W.R., Porchester Road, Paddington, London, W.2, price 1s.

* * *

A RETURN issued by the L.M.S.R. shows that upwards of 700,000 passengers, excluding season-ticket holders, were conveyed into Blackpool for the autumn illuminations during the month September 24 to October 24. On Saturday, October 8, a record was created by the L.M.S.R. in carrying 105,000 passengers, which means that over 200,000 people were dealt with at the two stations in one day. Blackpool easily holds the record for holiday crowds, as during the past summer season the L.M.S.R. has carried into the town over 3,000,000 visitors.

* * *

COL. SIR J. W. PRINGLE'S report to the Ministry of Transport on the collision which occurred on October 5, about 12.56 a.m., at Old Oak Common, G.W.R., has been issued. The trains concerned were a local train and a motor train, the latter, which was running engine first, colliding with the rear of the former. The accident took place under fog conditions. The principal responsibility is placed upon the driver of the motor train "for not acting with the extreme caution which the atmospheric conditions clearly demanded."

* * *

THE secretary of Crewe Memorial Hospital has received a cheque from the London Midland & Scottish Railway Company for £2,500 as a donation to the hospital funds. The institution is being extended at a cost of £15,000, and the railway company's gift was in commemoration of the town's jubilee. At the foundation stone laying, over £8,000 was placed on the stones.

PUBLICITY has recently been given to "the introduction" by the Great Western Railway Company "of a commercial delivery system. In many parts of the country, but mainly in South Wales, the company is undertaking to deliver to various customers' addresses goods consigned by factories to one big centre." This system is not new, as it was put in operation soon after the war. It is a development of the old-established collection and delivery service.

* * *

IN view of the conspicuous success attending the first half-day express excursion trip to Swindon, including an inspection of the railway workshops, on November 3, it was repeated a week later, with equal satisfaction to all concerned. Incidentally, the train was then hauled by the *King Edward VII* locomotive in charge of driver Young and fireman Pierce, this being one of their first turns on resuming ordinary duties after returning from the United States.

* * *

THE Great Western Railway announces that the 4.10 p.m. train from Paddington to Birkenhead for Liverpool and the 9.5 a.m. train from Birkenhead to Paddington, both of which connect with the Belfast boat, are to be called "The Belfast Boat Express."

* * *

IN connection with the new gas-works which are being erected at Burnley, the L.M.S.R. was asked to move a distance of 2½ miles a dump of about 250,000 tons of slag and colliery dirt from a nearby colliery. For the purpose, two special trains were brought into service and run on a shuttle service, one train being loaded at one end while the other was being unloaded at the other. The trains were composed of special wagons which enabled the dirt to be tipped on the exact spot required.

* * *

ON Friday, November 18, a lantern lecture was given by Mr. Cecil J. Allen, M.Inst.T., to the members of the Oxford University Junior Scientific Club, on the subject of "Railways—Their Engineering and Locomotives." The President of the Club—Mr. H. J. Phelps—in introducing the lecturer, remarked that, in proportion to its population, Oxford could probably claim a larger circulation of THE RAILWAY MAGAZINE than any other city or town in the country. Mr. Allen, who was enthusiastically received by an audience which crowded the lecture theatre in every part, a number standing throughout the proceedings, dealt first with

Digitized by Google

the considerations which underlie the planning of railways and the choice of routes, showing by illustration how the burden of capital expenditure, the length of route, and the cost of subsequent operation—governed by distance and relative severity of gradients—must all be carefully balanced in the engineer's mind in order to produce the most satisfactory economic results. This part of the lecture was concluded with a magnificent series of slides showing the work of the railway engineer amidst its maximum conditions of difficulty, amongst the mountain valleys of Switzerland. Attention was then devoted to the steam locomotive, and to the leading features of its design, as well as to the directions in which increased efficiency is being sought in modern designs. At the conclusion of the lecture questions were directed to Mr. Allen in considerable numbers, bearing on the subject-matter of the lecture, and were answered as completely as time permitted. A vote of thanks to the lecturer, proposed by Mr. J. F. Walden, Fellow of New College, was carried with acclamation.

* * *

WILLIAM BEARDMORE & CO. LTD., steel manufacturers, Glasgow, have received an order for 4,000 tons of permanent-way steel rails for the L.M.S. Railway. This order follows a similar one from the L.N.E.R. for rails for service in the Scottish sections of the respective railway companies.

* * *

WITH reference to the article on the Webb three-cylinder compound passenger locomotives, published in the December number, Mr. W. S. H. Boot points out that the number of *Ajax* is 509, not 504; No. 642, *Rover*, should be 643, *Raven*; and No. 1365 was a small 2-4-2 tank engine built in 1883, so that that number does not apply to *Archimedes*.

* * *

ON November 7 a direct railway service was inaugurated between Sydney and Broken Hill, 699 miles. Previously, railway passengers between these points had to travel *via* South Australia and Victoria, this journey involving 1,408 miles travel.

* * *

IT is estimated that over 40,000 persons paid for admission to inspect the "Royal Scot" engine of the L.M.S.R. on exhibition at Glasgow, Edinburgh, Dundee and Aberdeen. The proceeds, about £1,500, were distributed between the infirmaries in the four places.

AT a meeting of the York Section of the Permanent Way Institution, on November 16, at the Railway Institute, York, Mr. C. Travis, Associate Editor, *The Railway Gazette* read a paper, illustrated by lantern slides, on "The Railways of Australasia, with special reference to Permanent Way and Works." Mr. J. Miller, B.Eng., LL.D. Engineer, North Eastern Area, L.N.E.R., presided.

* * *

MEASURES to improve the working of the traffic on the "Tilbury" section of L.M.S.R. are being considered. Among the new facilities proposed is the running of further trains to Broad Street instead of Fenchurch Street, for which purpose certain platforms at Broad Street will be lengthened.

* * *

THE Walthamstow, Leyton and District Model Railway Club has been formed, and the Hon. Secretary, Mr. H. L. Purchas, of 40, William Street, Leyton, E.10, will be pleased to hear from readers who are interested in both model and full-size railways.

* * *

LT.-COL. A. H. L. MOUNT'S report to the Ministry of Transport on the accident on September 20 at Plaistow, L.M.S.R., has been issued. The goods train was hauled by 0-6-2T locomotive No. 2228, and the passenger train by 4-4-2T engine No. 2115. Responsibility is placed upon and admitted by the passenger-train driver, in that he had passed signals at danger, accepting the Plaistow starting signal which he could see ahead, although it was actually clear for the goods train, as applying to himself. Suggestions are, however, made as to the placing of signals concerned, and in regard to other matters.

* * *

THE Annual Exhibition of the Wimbledon Model Railway Club was held on December 12, and an interesting series of competition and loan models was shown. Mr. A. J. Temple's G.W.R. tank steam locomotive was at work on the track giving passenger trips. The prizes were presented by Mr. Percival Marshall (Editor of the *Model Engineer*, etc.), the principal awards going to Mr. A. R. Walkley (Club Cup); Mr. A. W. Lamb (1st Senior Prize); and Mr. J. Hoad (1st Junior Prize). Other prize winners were Messrs. R. P. Fentiman, P. Keete, J. J. Langridge, E. W. Rooksby, and S. Warren. Mr. J. F. Gairns presented the essay prizes to Messrs. England and Grose. These are reproduced in "Pertinent Paragraphs." Mr. T. B. Stoakley, President, occupied the chair. The Club will be represented at the Wimbledon Hobbies Exhibition on January 9.

Digitized by Google

SIR HERBERT WALKER, K.C.B., General Manager, Southern Railway, has been unanimously elected Chairman of the General Manager's Conference of the Railway Clearing House for the year 1928.

* * *

WE are officially informed that the Directors of the London and North Eastern Railway have made the following appointments :—

Mr. C. G. G. Dandridge, London District Passenger Manager, to be Advertising Manager, as from January 1, 1928, in succession to Mr. W. M. Teasdale, who, as recently announced, has been appointed Assistant General Manager (Parliamentary).

Mr. J. A. Jenkinson, Assistant District Superintendent, Manchester, to succeed Mr. H. D. Langridge as District Superintendent at Manchester on the retirement of the latter at January 31, 1928.

Mr. A. S. Buswell, Assistant District Superintendent, Marylebone, to be Assistant District Superintendent, Manchester.

Mr. C. B. Kirk, District Locomotive Superintendent, Norwich, to be District Locomotive Superintendent, Gorton, in succession to Mr. G. F. White, who retired from the service on October 29 last.

Mr. G. B. Hennessey, Assistant District Locomotive Superintendent, King's Cross, to be District Locomotive Superintendent, Norwich, in succession to Mr. Kirk.

Mr. L. Sproat, Assistant to the District Superintendent, York, to be Assistant District Superintendent, Newcastle.

* * *

MR. JOHN R. HIND, of the Press Section of the L.N.E.R. Advertising Department, has been appointed Information Agent.

* * *

NEARLY 8,000 interested observers, young and old, and of both sexes, took the opportunity of viewing the *Royal Scot* locomotive when it was placed on exhibition at Euston station on December 1, 2, and 3. In view of the great interest which non-stop running between Euston and Carlisle has occasioned, we may point out that driver Scott, who drove the up train on the first day the run was made, describes the trip in the December *L.M.S. Railway Magazine*.

* * *

THE fifty "Royal Scot" class 4-6-0's, Nos. 6100–49, have all been delivered from the North British Locomotive Company. No. 6145 is being tried on the Midland Division. With this exception, the class is allocated as shown on page 504 of the December issue. A series of twenty 0-6-0 superheater goods engines is under construction at Crewe, the first five of which, Nos. 4437–41, will be in traffic shortly. Of the same type, the North British Locomotive Company have delivered Nos. 4495–4502, and Barclays' Nos. 4378–9.

Class "G" 0-8-0's Nos. 9093, 9099, 9135 and 9137 (old Nos. 1497, 1122, 1424, and 1700 respectively) have been converted to class "G1" (superheater).

"Precursor" class 4-4-0's Nos. 665 *Mersey*, 2007 *Oregon*, and 2120 *Treatham*; and 4-4-2 ("Precursor") tank No. 1536, have been withdrawn for scrapping.

* * *

ON Wednesday, December 7, the Ljungström turbine locomotive built by Beyer, Peacock and Co. Ltd., worked the 11.15 a.m. express from Nottingham to St. Pancras. Arriving at 1.50 p.m., 20 minutes late due to fog, by a rapid turn-round the engine was able to work the 2.25 p.m. down Manchester express as scheduled. It is understood that the engine gave full satisfaction.

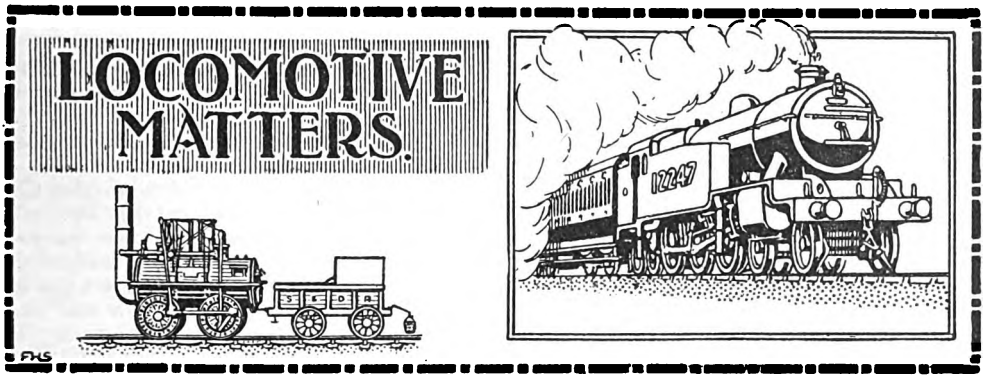
* * *

IN connection with the reconstruction of a bridge carrying the Southern Railway main lines over the river Medway near Maidstone, on Sunday, December 4, the lines between Maidstone and Barming were entirely closed to railway traffic in order to allow the old timber flooring of the bridge to be replaced by the new steel floor—125 ft. long and 26 ft. wide, weight 130 tons. During the 26 hours this work was in progress passengers were conveyed between Maidstone East and Barming stations by a service of motor omnibuses, and certain slight alterations were made in the train service between Victoria and Ashford (*via* Maidstone East) on the day. The old bridge was built in 1872.

* * *

THE bridge carrying the L.N.E.R. main line over the Great North Road, one mile north of Grantham, has been reconstructed. Part of the new work was placed in position on Sunday, November 27, and a further girder, 77 ft. in length and weighing 38 tons, was conveyed from Stanningley to the site during the following week, ready to be placed in position on the Sunday. The new bridge replaces an iron bridge built in 1852. The new girders were ordered from John Butler & Co. Ltd., of Stanningley, on October 20, so that delivery by the required date involved expeditious work. The replacement was carried out without interruption of traffic.

Digitized by Google



Under this heading will be inserted short references to news items relating to locomotive engines and their duties. It must be understood, however, that information as to the stations of particular engines cannot be given, for the reason that, before the date of publication, transfers may have taken place, while lists of engines, &c., debarred from "The Why and the Wherefore" section, cannot be included under this heading. With this understanding, notes as to matters thought to be of general interest will be welcomed.

L.M.S.R.

Engines of the 4-6-0 "Royal Scot" type noted recently on "The Royal Scot" are Nos. 6105 and 6102 (down train) and 6125 and 6104 (up train). Nos. 6136 and 6111 have been seen on "The Mid-day Scot," the latter engine being noted on Friday, October 28, with a 15-coach train. One of the latest—No. 6141—was observed at Stafford, on the 12 p.m. ex Euston, on the same day. Another working which appears to fall to the new engines is the up "London–Merseyside" express (Euston arrive 1.48 p.m.), on which Nos. 6125 and 6106 have appeared, each hauling 12 coaches. "George the Fifth" class 4-4-0 *Lord Loch,* is running with an ex-R.O.D. tender painted red and numbered 5321. This engine is now at Stafford shed. "Cauliflower" 0-6-0 No. 8594, of Walsall shed, is now fitted with Ross "pop" valves but still retains the round-topped firebox.—[C. R. Prescott.]

Midland 4-2-2 single No. 600 was recently noted at Birmingham. Prince 4-6-0 No. 5600, *Prince of Wales,* fitted with an R.O.D. tender, is now shedded at Walsall (9). "The Devonian," which leaves Birmingham at 1.35 p.m. for Bristol, is usually worked by class "2" and "3" 4-4-0's of the Midland type.—[F. V. W.]

"Prince of Wales" No. 5630 *W. M. Thackeray,* was noted at Crewe recently with an R.O.D. tender painted in L.M.S. livery. Midland section 2-4-0 No. 97, previously reported scrapped, was observed at Birmingham (New Street) during November bearing a plate marked "Rebuilt 1922, Derby." Nos, 1, 18, and 19 of the same type were also noted there. L. and Y. section 0-6-0 No. 12310 was recently at Trafford Park Sidings (C.L.C.) engaged in shunting operations.—[R. Dyson.]

Construction of a series of 2-6-4T's for mixed traffic and heavy suburban services has been commenced at Derby. A new style of numbering is employed on certain goods engines recently from the paint shops at Derby. These are Nos. 2567, 2699, 2767, 3139 (Ross "pop" safety valves), 3451 (Ross "pop" safety valves), 3704, 3756, 4003, 4006, and 4022. The number is placed as usual on the smokebox door, but is also painted upon the cab sides, while the initials "L.M.S." in large block letters appear on the tender side sheets. New 0-6-0's Nos. 4431 and 4432 are under construction at Derby, while Nos. 4458 and 4459 are in service.—[A. H. Lee.]

New standard 0-6-0T's Nos. 16483 and 16530–16534 are in the Stoke-on-Trent district engaged on shunting duties and occasionally working local passenger trains. 2-6-0's Nos. 13076/81–83 have been noted on a night express goods from Manchester to London, *via* Churnet Valley line and Moira Junction. No. 13076 is working from Longsight (16) shed, and the other three from Camden (1) shed. No. 13074 has also been noted at Stockport. On a recent Sunday L.N.W. "19-inch" 4-6-0 No. 2618 from Preston (27) shed, was noted on carriage-shunting duties in Blackpool (Central).—["Moonstone."]

Ex Wirral Railway 2-4-2T No. 17 bears the L.M.S.R. No. 6761, and not 4997, as given in these columns in the November issue.—[R. F. Lanchester.]

L.N.W.R. locomotives recently seen fitted with Belpaire fireboxes and "pop" safety valves include "Georges" Nos. 5281, *Erebus,* and 5292, *Medusa,* of Crewe (15) shed, and "19-in." goods Nos. 8814 and 8855, of Stafford (14) shed. "Claughtons" running regularly on Manchester to London

Digitized by Google

expresses (*via* Stoke) are Nos. 6011 *Illustrious*, 6013, 6014 and 6017, *Breadalbane*, stationed at Longsight; 5982, 5986 and 5990, of Camden shed. N.S.R. 0-6-2T No. 2258 has been fitted with chimney and dome similar to the 0-6-4T's of class "4," and retains the Belpaire firebox with which it was originally fitted. L.N.W.R. 4-4-2T's and 4-6-2T's work regularly into Macclesfield (Hibel Road) on Manchester trains, all of Longsight shed. Of the "Princes" stationed at Longsight, Nos. 5700 *Telford*, and 5706 *Canning*, are working into Stoke, and 5693-5 have been observed at London Road (Manchester). "Claughton" No. 6016 was also seen there.—["NIAGARA."]

Midland 4-4-0's, Nos. 381 and 393, have returned to Carlisle, L.N.W., shed from Sheffield and Edge Hill respectively, for the purpose of working passenger trains, *via* Whitehaven, to Carnforth. "Precursors" Nos. 5204 *Havelock* and 5205 *Apollo* of Carlisle shed, also work over that route. 4-4-0 "Compounds" Nos. 1157 (with 1176 tender), 1158 (with 1178 tender) and 1159 are stationed at Carnforth and work between Windermere and Preston, and to Morecambe. They also work daily over the Furness line to Grange-over-Sands on trains from Lancaster. "Experiments" Nos. 1616 *Lancashire*, and 5540 *Oxfordshire*; "Precursors" 5262 *Celtic* and 5263 *Oceanic*; and "Renowns" 1911 *Centurion*, 1913 *Canopus*, and 5131 *Renown*, are stationed at Carnforth and work over the Furness section to Carlisle. Ex.-Cleator and Workington Railway 0-6-0ST No. 11567 *Millgrove* is employed on shunting duties in Carnforth N.W. yard. Furness 0-6-0's Nos. 12494 and 12495 are stabled at Workington L.N.W. They were exchanged for standard 0-6-0's Nos. 4397 and 4398, which are now at Carnforth. *Standard* 0-6-0 No. 4101 and *Furness* 0-6-0 No. 12510 are working from Tebay, and on coke traffic between that point and Lindal-in-Furness. 2-6-0's Nos. 13050-13056 are shedded at Leeds, Midland; Nos. 13054 worked excursions to Barrow during the summer. Nos. 13066-13068 are at Kentish Town, and have been seen on express goods to Leeds. Nos. 13015/16/19/22/23 are stabled at Low Moor. "Compounds" Nos. 1185 and 1186 have been transferred from Newton Heath to Low Moor, and work trains from Bradford Exchange to Nottingham, *via* Thornhill. New 0-6-0's Nos. 4407-4411, built Derby, 1927, are working from Sheffield. No. 4107 (shed, Edge Hill), and 4352 (shed, Stockport), have recently been seen working goods to Sheffield.—["FURNESSIAN."]

"Royal Scot" type No. 6127 (class "6") was on exhibition for charity in Dundee during the first week-end of November. The name plate was blank. Previously, the highest class to visit Dundee was class "5," No. 14800, a 4-6-0 working Glasgow expresses. —[E. MAXWELL.]

The number, 14414, applied to the Caledonian 0-4-4T reported in the December issue as passing through Stourton *en route* to Carlisle from Derby shops, is incorrect as the early 14400's are Highland 4-4-0's and No. 14414 is *Ben Udlaman*, which was working in the Elgin district in August. The Caledonian 0-4-4T's are numbered with the 15200's.—[W. B. P. MILNE and W. E. C. WATKINSON.]

New 4-6-0's 6129 and 6130 have gone to the Caledonian from the Midland section. No. 6132 was open to public inspection in Edinburgh, October 27-29.—[R. A. READ.]

Passenger traffic on the Bootle branch is mainly dealt with by 0-6-2T's Nos. 6886 painted red), 7758, 7608, 7621, 7681 and 7789. The last two engines still retain the L.N.W. black livery, but 7681 has the number in raised figures on the smokebox door, while 7789 is painted in small yellow figures on the tank sides of the other locomotive. 4-6-2T's Nos. 6987 and 6975 (both in red livery) are frequently to be seen working early morning trains on this line. 0-8-2T's Nos. 7949 to 7955 and 7957 to 7959 work the goods traffic assisted by 0-6-0T's Nos. 7121, 7124, 16468 and 16469. Southport to Edgehill trains are generally hauled by L. & Y. 4-4-0's Nos. 10178 or 10109, and sometimes by 2-4-2T's of the same section, all wearing the red livery.—["L.Y.R."]

The 10.30 a.m. ex-Euston, loading from 13 to 16 coaches, when running undivided, is often worked by "Royal Scot" locomotives.—[W. R. COLEBY.]

Precursor, L. & N.W., No. 513, is No. 5278, not 5187 as suggested by a correspondent.—(ED., R.M.)

No. 14272 (ex H.R. 92A), reported broken up, was seen at Elgin in July bearing the original name *Strathdearn*. No. 14277 (ex H.R. No. 67), *Cromartie*, also stated to have been withdrawn, was seen at Inverness (without name) in the same month.

No. 14277 resembles the 1889 series of "Skye" bogies, and this may account for the misunderstanding. It is suggested, on the authority of the late Mr. E. L. Ahrons, that No. 14272 was at one time named *Glendearne*. The "Royal Scot" engine exhibited in Glasgow was No. 6127.—J. McINNES and J. F. McEWAN.

L.N.E.R.

The new 3-cylinder 4-4-0's under construction at Darlington for service principally in Scotland and the north of England and

Digitized by Google

which are being named after counties are classed D 49/1. Those fitted with Lentz valve gear will be D 49/2, and those fitted with special valve gear D 49/3.—[R. A.H.W.]

Class "J 39" 0-6-0's Nos. 1265-1267 and 1269 have been working over the Colchester main line recently.—[GEORGE H. YOUNG.]

G.C. 0-6-0 No. 5316 was recently noted passing Withington (L.M.S.R.) on an express goods. During September a G.C. "Claud" 4-4-0 No. 8810 passed through Manchester Victoria, L.M.S.R., bound from Newmarket to Pendleton (L.M.S.R.) with a load of horse-boxes in connection with Manchester races.—[R. DYSON.]

The numbers quoted in the December issue for the "J 39" class 0-6-0's noted on the G.E. section probably should have been 1265 and 1269 as Nos. 1235 and 1239 are class "R 1" 4-4-0's.—[R. F. LACHESTER.]

N.B. "Atlantic" 9881 has now new frames. No. 9126 0-6-0 of class "B" has been lately superheated. The latest G.N. 4-4-0's to be fitted with Westinghouse brakes are No. 3053, 3055, 3061 and 3063. "Director" 6400 *Roderick Dhu* has been transferred from Eastfield to Haymarket.—[R. A. REED.]

Nos. 234, 251 *Derbyshire*, 253 *Oxfordshire*, and 250 *Hertfordshire* of the new "D49" 4-4-0 class are now painted green and working trains in Darlington area. No. 990, 0-6-0 "398" class has come to North Road works for scrapping. She was built by Hawthorn's in 1874. The 4-6-4 electric locomotive No. 13 recently underwent some trials on the Shildon-Newport electrified section, but has since returned to the paint shop at North Road works. N. B. 4-4-2 No. 9876 and N.E. 4-4-0 No. 2029 were noted on a "fish" train at Newcastle. A number of 3-cylinder 4-4-2's work back to their home shed on goods trains.—[J. W. ARMSTRONG.]

No. 234 is named *Yorkshire* and No. 251 *Derbyshire*.—["MONK BAR."]

G.W.R.

A number of 4-6-0's other than those of the "King" and "Castle" classes are being fitted with the smaller "Castle" pattern safety-valve casings. During July last a S.R. (S.E. & C.) section 0-6-0 was noted working a train of empties from Oxford to Reading. Many of the 4-4-0's at Reading and Oxford sheds are fitted with the Westinghouse brake, as they are used for handling Westinghouse fitted stock from the L.N.E.R. and S.R. Ex M.S.W.J. 2-4-0 No. 1335 fitted with cab signalling apparatus has been working between Reading and Newbury.—[G. F. RAYNOR.]

4-4-0 No. 3255, *Excalibur*, was recently noted passing Oxford on a fast perishable goods train. A few minutes later, passing the engine sheds, Southern Railway 4-6-0 No. 736E, *Excalibur*, was noted, ready to take the Birkenhead-Bournemouth train forward. G.W.R. 4-6-0 No. 4024 is named *Dutch Monarch*, without the word "The". Small 4-4-0 No. 3551 was noted shunting at Oxford.—[G. E. P. HORNBLOWER.]

No. 6002 is named *King William IV* and No. 6005 *King George II*.—[Reply to S. JAMES.]

Locomotives now stationed at Landore include 4-6-0's Nos. 2908 *Lady of Quality*; 2902, *Lady of the Lake*; 2941, *Eastern Court*; 2945, *Hillingdon Court*; 2955, *Tortworth Court*; 2972, *The Abbot*; 2984, *Guy Mannering*; 2986, *Robin Hood*; 4055 *Princess Sophia*; and numerous 4-4-0's, including Nos. 3310, *St. Just*; 3454, *Skylark*; 4122, *Colonel Edgcumbe*; 4154, *Campanula*; and 4155, *Cineraria*. Two tank locomotives of the "31XX" class, Nos. 3115 and 3118, have also been noted there.—[W. D. BEVAN.]

The "King" class engines, renamed as the "Monarch" series, do not use the word "The" in new titles. The M.S.W.J.R. 2-4-0's mentioned last month should be given as Nos. 1334-5-6. No. 1337 is the old *Hook Norton* now scrapped. 4-4-0 No. 3361, *Edward VII*, has lost its name. It is now at Reading, with No. 3290, *Severn* ("Duke" class). It is understood that No. 4125 has been scrapped, and that others of the "Flower" class are to be withdrawn.—[R. WEBSTER.]

S.R.

No. E834, the latest of the new series of 4-6-0 goods engines has recently left the paint shops at Eastleigh. 2-6-0's Nos. A830 and A850 have been to Eastleigh for light repairs. Brighton section 0-4-2's Nos. B193 and B197 worked horse-boxes to Eastleigh in connection with Bournemouth races and were stabled at Eastleigh shed.—[G. WOODWARD.]

B4/X 4-4-0's Nos. B55, B72, and B73 are at Bognor and Nos. B43, B45, B50, B52, B56, B60, B67, B70, and B71 at Eastbourne. The Eastbourne engines work six trains to London. Unrebuilt 4-4-0's Nos. B47 and B58 frequently work to London also.—[W. H. L. KENNING.]

All the 2-6-4T engines of the Eastern section which have been standing at Reading have now left.—["LORD ST. LEVAN."]

Double track between Brading and Sandown (Isle of Wight) has been in service for some time past.—[D. P. FISHER.]

The new series of 4-6-0 goods engines are now in service up to No. E834. They are located as follows:—E823 to E827, Exmouth Junction; E828 to E832,

Digitized by Google

Salisbury; E833 Feltham; and E834, at present working from Eastleigh. Nos. E114-115, E280 and E717, are among the latest L.S.W. section 4-4-0's to be fitted with superheating equipment. Nos. E636 and E644 have been re-boilered. "King Arthur" class, 4-6-0's Nos. E743, E765, E787, E798, and E800, are fitted with wind deflecting screens, similar to that fitted to No. E779 of the same class. E491 has been rebuilt with a "King Arthur" class boiler with "pop" pattern safety valves. The 6-ft. coupled wheel engines of the "330" class, Nos. E330 and E332, have been working on the fast Bournemouth services from the latter shed, whilst No. E331 is now at Nine Elms and often works the 9.30 a.m. train from Waterloo. No. E496, stationed at Feltham, is fitted with the Ashford type superheater.—[745 "TINTAGEL."]

Instances of triple-headed goods trains have been noted at Templecombe.—[J. D. COOMBS.]

G.N.R. (Ireland).

Further small 4-4-0's recently equipped with superheating apparatus include Nos. 46, 54, and 89. It is understood that Mr. Glover intends to superheat all the passenger engines of this line. Old 2-4-0's Nos. 84, 85, and 86 are at work between Armagh and Warrenpoint. Old class "E" 0-6-0 No. 194, built in 1873 worked into Warrenpoint on an excursion train. Rebuilt 4-4-0 No. 122 now has a large tender similar to those fitted to the 0-6-0's of class "D."

Acknowledgment is also due to S. P. W. Corbett, J. Spencer Smith and "4479 Robert the Devil," for notes received on locomotive observations made during the past month.

BRAY STATION IN COURSE OF RECONSTRUCTION, GREAT SOUTHERN RAILWAYS, IRELAND.

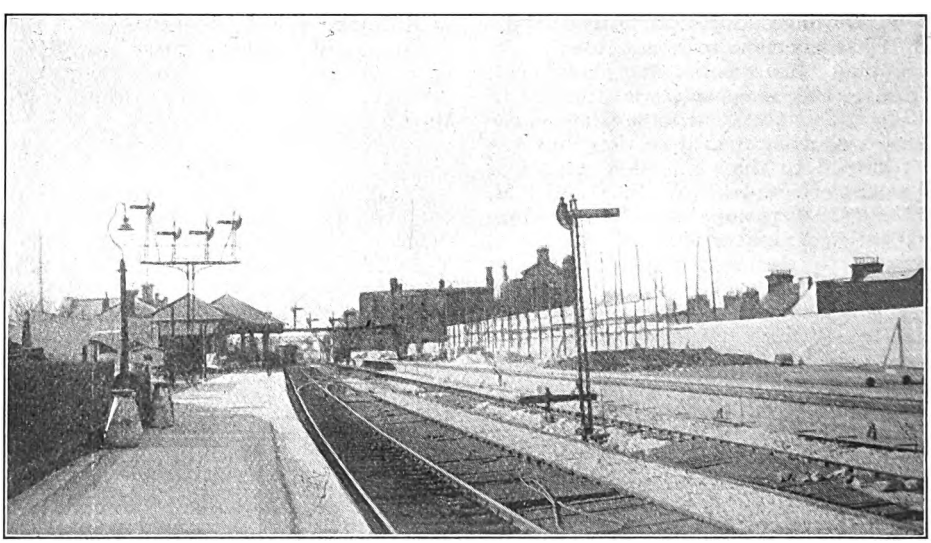


Photo.] [*J. Macartney Robbins.*

A NEW platform at Bray station, Great Southern Railways, Ireland, has been constructed for the purpose of dealing with heavy excursion traffic. It is 680 ft. long, and is roofed over for 250 ft. The signalling arrangements have been modernised, and traffic can arrive at and depart from either of the two platforms now in the station. New mechanically-operated level crossing gates have been put in, and there is a footbridge which gives access from one platform to the other. Direct communication with Bray Esplanade has also been provided, and the station yard has been relaid.

Digitized by Google

Digitized by Google

Digitized by Google

GENERAL VIEW OF STATION AT HUNT'S BANK CORNER.

Notable Railway Stations and their Traffic.

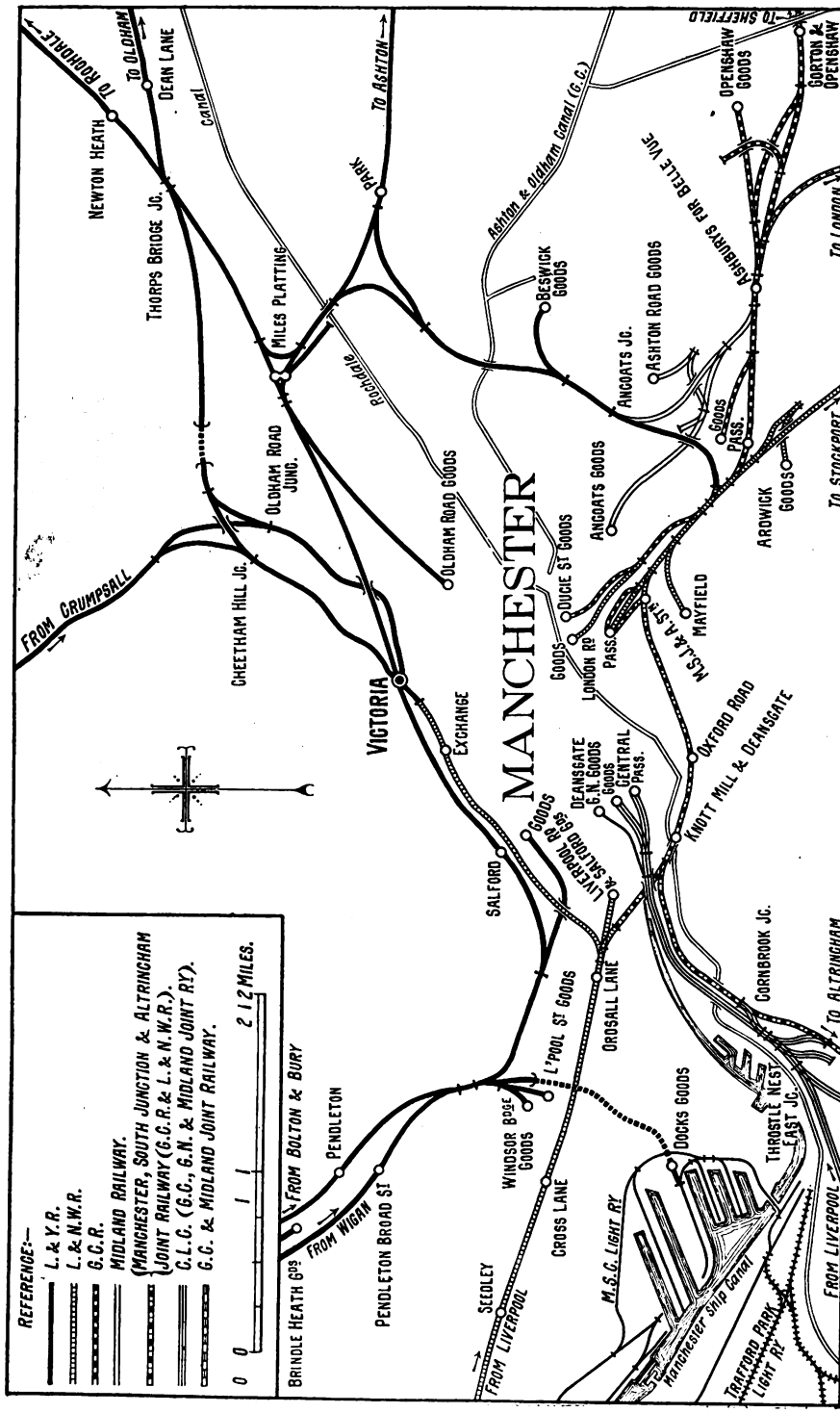
VICTORIA, MANCHESTER, L.M.S.R.

By J. F. GAIRNS, M.I.Loco.E., M.Inst.T.

THIS station has on two former occasions received attention in the pages of the RAILWAY MAGAZINE. The first, and most detailed, article was included in the original "Notable Railway Station" series, and was published in the June, 1901, issue, the author being Mr. J. H. Matthews. At that time, however, there were 12 platforms only, while the main block of station buildings on the Hunt's Bank side, and the new railway offices there, were then only contemplated or in early stages of progress. In the May, 1909, number Mr. Robert Cotton described in outline the result of the enlargement carried out in 1904–5, the lay-out being practically that of to-day, but, as he was mainly concerned with "the Lancashire and Yorkshire Railway in the Manchester District," his references, although fairly extensive, did not amount to an actual description of the station.

As the headquarters of the late Lancashire and Yorkshire Railway, Victoria station ranked as the most important on that system, but it also laid claim to being the biggest and busiest, in that it has no fewer than 17 platforms (entitling it to a high place among the "Largest Railway Stations in the British Isles"), while it deals with a large volume of suburban traffic, is the centre for many important inter-town services, and handles long-distance residential, seaside, and holiday traffic on a notable scale. It is also important in regard to express main-line traffic, in that, although this traffic

Digitized by Google



PLAN OF RAILWAYS IN MANCHESTER DISTRICT, SHOWING ROUTES CONVERGING ON VICTORIA STATION.

Digitized by Google

on the late Lancashire and Yorkshire Railway was sometimes said to be of a "magnified suburban" character, owing to the relative shortness of most of the main-line journeys operated by that company, it also supplied through connections in conjunction with the long-distance facilities of several other lines.

The incorporation of the Lancashire and Yorkshire Railway, first in the London and North Western, and since grouping in the London Midland and Scottish Railway, has altered the situation in some respects, though, as train services and facilities have not been changed to any material degree, this applies mainly in regard to ownership, headquarters organisation, and station management, and has not affected traffic characteristics and operating methods and conditions to any great extent. For example, prior to amalgamation and grouping, Victoria station had the peculiarity that London and North Western trains proceeding east of the adjoining Exchange station passed through the middle of Victoria station, using two through non-platform lines, an arrangement which still applies, although both stations now belong to the same company and one stationmaster has the oversight of both stations—the staff being also, in some degree, common to both. Possibly, in due course, there will be a degree of common user, but at present each station has its own services and facilities, so that the old operating arrangements continue to apply, though the question of "running powers" no longer arises. Similarly, while the headquarters offices no longer rank as such, they continue to accommodate a large proportion of the Manchester staff of the L.M.S.R., though now mainly as a divisional headquarters.

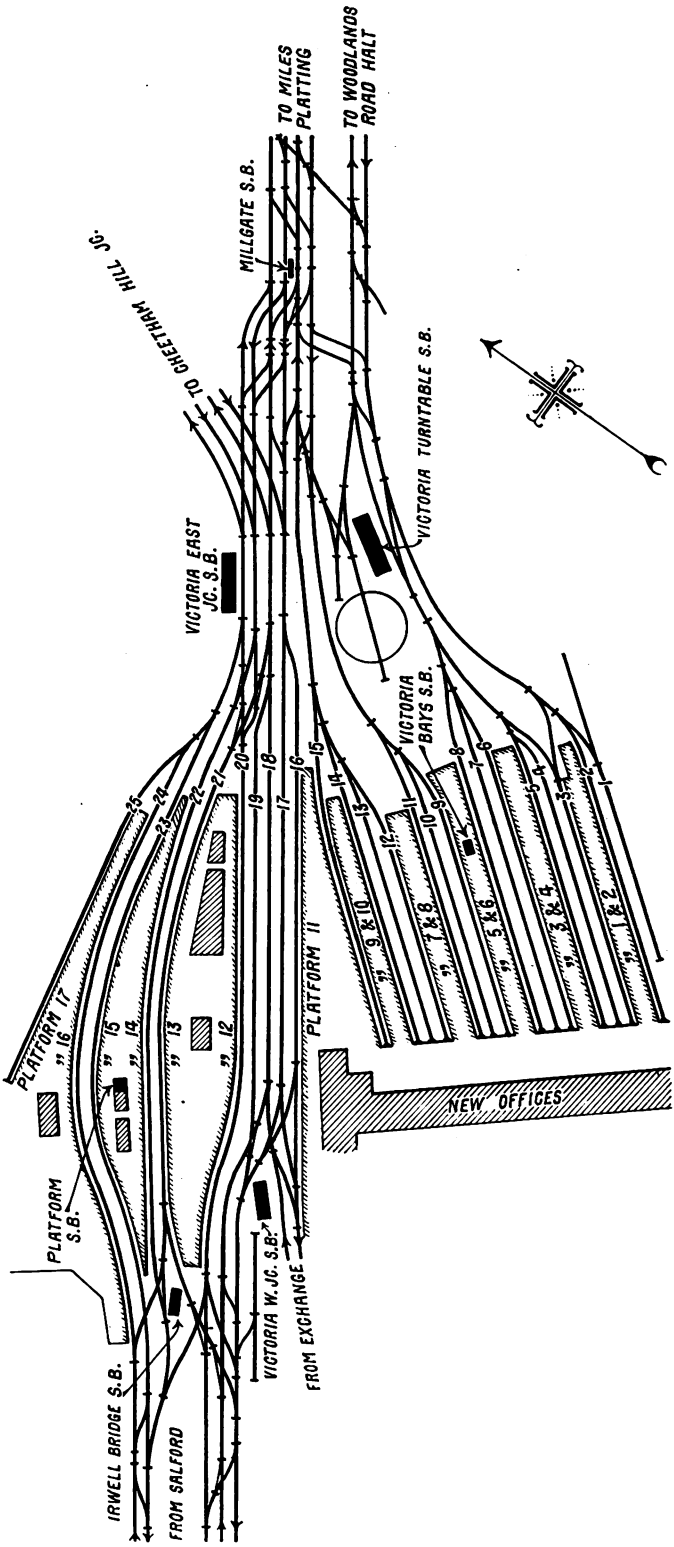
Victoria is the most northerly of the big Manchester stations, and of its 17 platform lines, 11 are terminal, all for trains approaching from the east or north-east. The remaining six platform lines, with three non-platform lines, are adapted for through train working. They are also used by terminating trains from the west and north-west, and to some extent by trains from the east or north-east, but in many cases trains which are shown to do so in the public time-tables extend their journeys empty to or from various carriage sidings. The actual through trains are mainly those between Newcastle, York, Goole, Wakefield or Leeds, and Bradford to Liverpool, connections with Euston trains to serve Victoria station, Colne, Blackburn and Accrington, and a few other services, some of a seasonal character. There are also services which, from the public time-table point of view, are terminal, connecting with L.N.W. section main-line trains at Preston or with Midland section main-line trains at Hellifield, which include through carriages to and from Scotland, the Lake District, Morecambe, &c.

To appreciate the traffic importance of Victoria station, it is necessary to consider the various routes which centre upon it and their relations one to another, and, before dealing with the station in detail, reference may be made to the sketch map reproduced on page 88. This indicates pre-amalgamation and pre-grouping ownership, as this is not only of interest, but is advisedly covered, in that it is a factor in the allocation of the respective train services.

From the west all L. & Y. section trains approach Victoria over the four running lines available for passenger trains from west of Salford, though further out these serve a complex system of routes, some ultimately providing for journeys to more northerly destinations also accessible and generally served by north-easterly routes allocated to the eastern end of the station. The four tracks mentioned (apart from sidings and goods lines) generally parallel the L.N.W. section lines into Exchange station. The latter has two terminal platform lines and three through lines, the latter connecting with two of the three through non-platform lines in the middle of Victoria station used by L.N.W. through-trains (also by goods trains, &c., belonging to both sections), as already mentioned.

At the east end of Victoria station all platforms serve one or more of the four sets of up and down lines which extend toward Miles Platting, except that, beyond crossovers between the respective pairs of lines, the most southerly pair, now generally used by electric trains, passes under the main lines to proceed in a northerly direction. Platforms Nos. 11–17, together with the through non-platform lines

Digitized by Google



PLAN OF VICTORIA STATION, MANCHESTER, L.M.S.R.

Digitized by Google

already referred to, connect also, however, with a four-track route curving north-westerly to the Cheetham Hill junctions, where interchange connections are made with the two burrowing lines from the south side of Victoria station previously mentioned, so that, actually, trains from any part of the station can proceed either direct *via* Miles Platting or *via* Cheetham Hill to the route which diverges at Thorpe Bridge Junction, near Newton Heath, or north-westwards to Bury and other Lancashire towns. The only routes, in fact, which can only be reached *via* Miles Platting are those towards Ashton and Stalybridge *via* Park Junction, and the connections, mainly used for goods traffic, south to the Ardwick district, where complicated connections are made with lines which, prior to grouping, were London and North Western, Midland or Great Central property.

Before dealing with the surroundings of the station and its various premises, it will be best to describe its operating lay-out. There are 25 lines and 17 platforms, which may be set forth, with track and platform numerations (both of which are in use, the former by the staff only), as follows :—

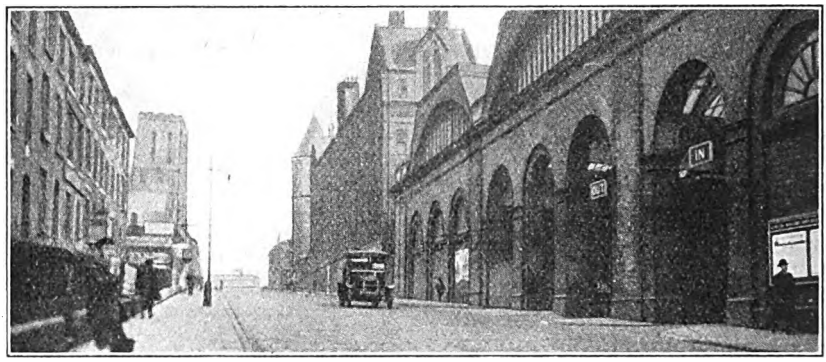
Track No.	Platform No.	General Allocation of Traffic.
	A.—*Terminal for Traffic via East End.*	
1	—	Fruit, fish, perishable and theatrical traffic, &c.
2	1	Prestwich, Bury and Bacup.
3	2	Do.
4	Middle Road	—
5	3	Heywood and Bury.
6	4	Do.
7	Middle Road	—
8	5	Middleton.
9	6	Do.
10	Middle Road	—
11	7	Oldham, Royton and Shaw.
12	8	Do.
13	Middle Road	—
14	9	Ashton and Stalybridge.
15	10	
	B.—*Through-Lines and Platforms.*	
16	11	From Yorkshire and to Bolton, Wigan, Southport and Liverpool.
17	Through	L.N.W. Section trains, &c.
18	Through	Do.
19	Through	Used as siding.
20	12	From Yorkshire and to Preston, Blackpool, &c.
21	13	From Liverpool and to Yorkshire.
22	14	From Yorkshire and East Lancashire, and to Bury, Accrington, Burnley, Colne and Atherton.
23	15	From Southport, Blackpool, &c., and from Atherton.
24	16	From Scotland, Blackpool, Southport, &c.
	C.—*Terminal for Traffic via East End.*	
25	17	As required for eastwards traffic and for parcels, milk and other trains, and for loading and unloading of horses, &c.

Platforms Nos. 1-3 (tracks Nos. 2-5) are equipped for electric traction.

An interesting feature is that platform No. 11 will shortly extend continuously right through to Exchange station. It had always provided an inter-communication pathway, until temporarily barriered off while alterations are in progress, but whereas formerly No. 11 platform line terminated at buffer stops, through trains diverging to the middle line to continue journeys westwards, it is now being carried right through so that there will be one continuous platform face, available for train use throughout its length, having a total length of 2,196 ft., the longest of any single railway platform in the world. This work has involved the erection of additional girders to carry the line and platform across the River Irwell.

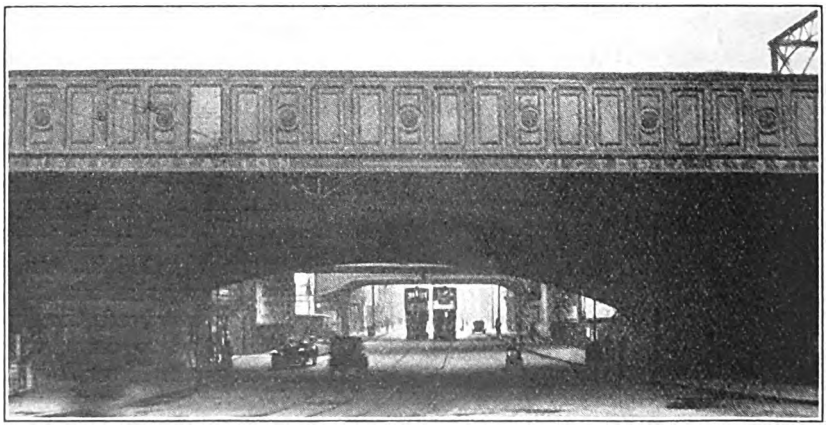
Victoria station occupies a peculiar site close to Manchester Cathedral, owing to the complicating effect of the rivers Irwell and Irk upon various thoroughfares in the vicinity and the necessity for several

Digitized by Google



ENTRANCE FROM NEW BRIDGE STREET.

ENTRANCE FROM GREAT DUCIE STREET.



BRIDGES OVER GREAT DUCIE STREET.

Photos.] [*J. F. Gairns.*

Digitized by Google

bridges to cross them. A further factor is the adjacency of Exchange station. This aspect is best realised by approaching Victoria from the junction of Deansgate and Victoria Street, where they converge at an acute angle, other thoroughfares completing a quintuple junction. Victoria Street is continued across this junction to Great Ducie Street, a wide road bordered on one side by the River Irwell. A little way along is Manchester Cathedral, on the right, while opposite this is a wide road crossing the River Irwell and Greengate Street by a bridge, so as to give access to Exchange station. Just beyond this bridge the River Irk is crossed where it runs into the Irwell over a weir (the River Irk passes under the newer part of Victoria station), and shortly beyond a road diverges on the left (crossing the Irwell) to connect with Exchange station low-level cab yard and with Greengate Street. From this point Great Ducie Street continues onwards to pass under the through portion of Victoria station (part of the station and the connection with Exchange station is on another bridge over the river), while to the right a road slopes upwards, to reach Hunt's Bank, which fronts the newer part of Victoria station and constitutes the main entrance.

Hunt's Bank would normally be merely a quiet thoroughfare, but part of it, in front of the main booking hall, is roofed over so as to constitute the station courtyard, the whole of one side being taken up by station buildings, including refreshment and waiting rooms, dining rooms, &c., as well as the booking hall, with office premises above. At the corner the station buildings have an ornamental frontage, with clock tower, readily visible from Corporation Street, whence so many local passengers approach the station, though a very short street intervenes. There is also access to the station from Corporation Street through Halliwell Street and across Long Millgate, and thence direct to the circulating area parallel to Hunt's Bank through a passageway at the end.

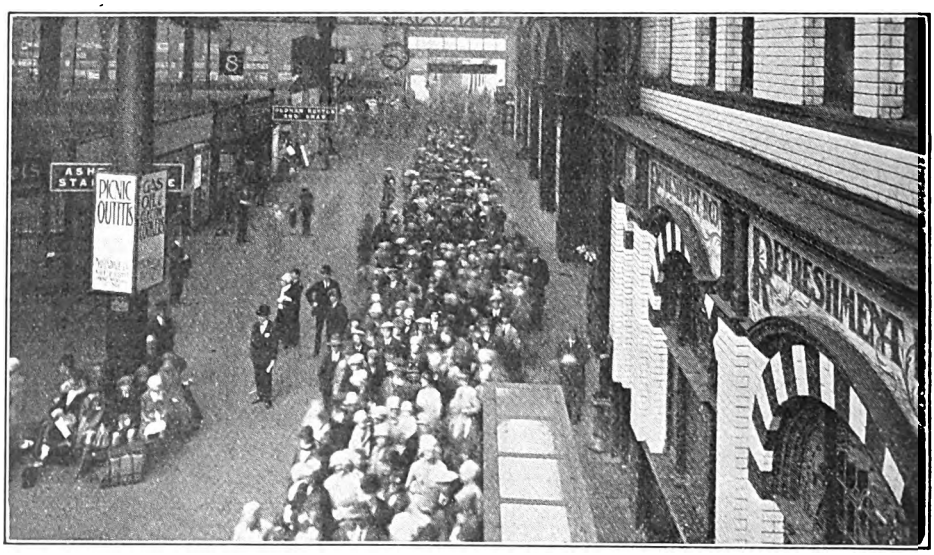
The south side of the station is bordered by Long Millgate, which soon after merges into Corporation Street. Thence, at another convergence of several roads, a wide bridge carries Cheetham Hill Road across the whole width of the station at its east end. At one point this bridge has an opening to a stairway leading down to low-level streets on the north side of the line, adjacent to which is a weir where the River Irk falls to pass under the station to reach its junction with the Irwell previously mentioned. New Bridge Street constitutes the northern boundary of the station. Some distance along is an entrance to a covered yard, used for parcels and milk traffic, as it is handy to Nos. 16 and 17 platforms, where these traffics are mainly handled. Passengers can also enter the station here, as barriers give access to Nos. 16 and 17 platforms and others *via* the subway, to be described later. This entrance serves more particularly the Strangeways district.

Beyond this entrance, on turning a corner, Great Ducie Street is rejoined. This also has an approach to the station, in that, before reaching the series of bridges which carry the through portion of the station over that thoroughfare, a roadway is provided leading to a parcels and cab yard curiously located in a kind of well below a railed-off opening in Nos. 12 and 13 island platform. This roadway has a raised walk for pedestrians on the left-hand side, to serve a stairway (now closed) to Nos. 14 and 15 platforms, though it eventually returns to the same level as the roadway, where the yard mentioned is reached, whence stairs lead up to an enclosure, with booking office and collectors' gates, in the middle of Nos. 12-13 island platform.

Internally, Victoria station also includes unusual features, though it is, on the whole, very conveniently laid out, while the newer portion, adjacent to Hunt's Bank, compares favourably with many great stations which have not been so severely handicapped by the exigencies and peculiarities of the site. Platforms 1-11 are al approachable directly from the main circulating area here, a wide space bordered on one side by station offices and on the other by ranges of gates giving access to these platforms. On th Hunt's Bank side may be noted, in addition to the booking hall, refreshment rooms (including an underground café), a restaurant, waiting rooms and lavatories, the last-mentioned with hair dressing saloon. The booking hall itself is open, except for supporting pillars, to the

Digitized by Google

VIEW OF PLATFORMS 12 AND 13.



VIEW OF CIRCULATING AREA, SHOWING QUEUE FOR BLACKPOOL TRAINS.

Digitized by Google

circulating area, while two wide openings on either side of the booking office proper lead from the covered portion of Hunt's Bank. At each end of the booking hall are large tile maps of the late Lancashire and Yorkshire system, and below one of them is the War Memorial erected in memory of Lancashire and Yorkshire railwaymen who gave their lives during the Great War. Behind the buffer stops of platforms Nos. 1-9 are bookstall, Benn & Cronin time-table indicator, &c., while elsewhere there are tobacco and fruit stalls, advertising stands, glass-case models of engines, steamships and a sleeping car, and a big indicator showing the platforms from which trains start.

Further along, the circulating area opens into a space, on the left of which are Left Luggage and Parcels Offices, extending round along No. 11 platform, while on the right, before reaching the gates which control public access to that platform, is a distinctive range of barriers at the head of a slope to the subways by which platforms Nos. 12–17 are served from this side of the station. This subway, with its approach slope, is of considerable width, as it had need be, in view of the very large numbers of passengers using it at busy periods. As it passes under the two islands which constitute platforms Nos. 12–13 and 14–15, stairways lead up thereto, while it slopes up at the end to serve Nos. 16 and 17 platforms.

Of the two islands, Nos. 12–13 claims precedence (though similar trains may be dealt with at 14–15, or at No. 11), in that it has about midway a block of buildings, one with four clock faces, accommodating at platform level a booking-office for passengers entering from Great Ducie Street *via* the roadway previously mentioned, and, above, the stationmaster's offices. Distributed along the platform are the well over the low-level cab yard already referred to, and refreshment and waiting rooms, &c. Nos. 14–15 island also has suitable accommodation, but on a less elaborate scale. Above the buildings is a disused signal cabin. No. 16 is principally notable because of its access to the Strangeways yard and the range of offices belonging to the Chief General Superintendent's Department towards the western end.

The station is spanned towards its eastern end by a luggage bridge, with hoists on every platform. In addition, there is an overhead run-way following a curved track located so that the various centres for luggage and parcels traffic and all platforms can be served directly. This has been in service for more than 20 years, and is still largely used. The driver travels with the car, and suspended below him is a large basket, which can be lowered to or raised from platform level as required. The station is well supplied with train indicators of various types located wherever there is need, while there are several small refreshment rooms here and there, as well as the main ones on the Hunt's Bank side. There are also staff premises here and there, while above the Parcels Department premises on No. 11 platform is a club and canteen for station workers.

The Victoria stationmaster is responsible for signal boxes as follow :—

	Levers.		Spare.
Smedley Viaduct	48	inc.	12
Cheetham Hill Junc.	64	,,	7
Footbridge	43	,,	17
Victoria East Junc.	106	,,	10
Victoria West Junc.	40	,,	9
Victoria Turntable	124	,,	34
Irwell Bridge Junc.	120	,,	20
*Irwell Bridge Sidings ..	32	,,	3
Deal Street Junc.	44	,,	1
Newtown No. 1	62	,,	13
Newtown No. 2	40	,,	9
Millgate	79	,,	19
Queen's Road	36	,,	5
Irk Valley	20	,,	3
Exchange No. 1	54	,,	5
Exchange No. 2	96	,,	6
Salford Station	92	,,	25
Oldfield Road No. 1	50	,,	11
Oldfield Road No. 2	100	,,	8
Windsor Bridge No. 1 ..	72	,,	22

* Not a Block Post.

Also Hope Street and Salford Junction Goods Cabins.

Signalling is generally mechanical, though the installation of electric signalling with colour light signals is contemplated, but all lines are track-circuited. The East and Turntable boxes at Victoria have illuminated diagrams of the spot-light type, while Irwell Bridge Junction box has similar diagrams in duplicate, so that each range of levers has one to itself to avoid the necessity for men walking to and fro to refer to it. Several outlying signals are operated electrically, owing to their distance from the box controlling

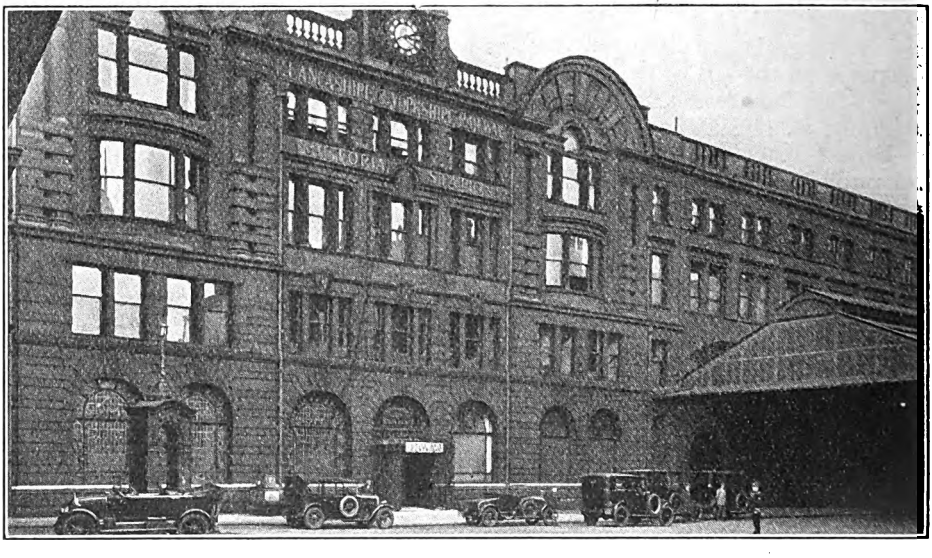
Digitized by Google

them. In the case of traffic east of Victoria, a system of Code Rings indicating routes is in force between Miles Platting and East Junction boxes, instead of the ordinary train description code. At the east end, signalling is of a sectional character, Turntable box dealing with all movements relating to tracks Nos. 1–15, and East Junction those on tracks Nos. 16–25. Transfer movements between the two sections are usually *via* Millgate box. All main signals are fitted with electric reversers. Of the 550 signals associated with Victoria station, including boxes under the oversight of the Victoria stationmaster, 512 are lit electrically, the others by long-burning oil lamps. There are also 245 sets of points.

Below the railway, in the arches outside Nos. 1–10 platforms, is a sub-station for the electric services, with battery plant in reserve. Power is also obtained from here for station lighting and track circuits, and for electric hoists and equipment about the station.

Platforms 1–10 inclusive are terminal to traffic from the east end. Nos. 1 and 2 are ordinarily reserved for the electric trains on the Prestwich and Radcliffe route to Bolton Street station, Bury. These consist normally of five electric cars, reduced during the quieter hours, and provide virtually a five-minute service during the rush periods, though some of the trains terminate at Prestwich and occasionally, Whitefield or Radcliffe, instead of making the complete journey. At other times of the day there is at least a 20-min. service, except that around the mid-day hours the service is a 10-min. one, in view of the extent to which "contract" holders go home for the mid-day meal. On Sundays the service is half-hourly, on which day, moreover, one class only is provided.

While No. 3 can also be, and often is, used to provide further accommodation for electric trains, Nos. 3 and 4 are generally allocated to steam trains to Bury (Knowsley Street and Bolton Street stations) *via* Middleton Junction and Heywood, a route on which a fair number of trains run. Nos. 5 and 6 accommodate Middleton trains. Nos. 7 and 8 platforms are devoted more particularly to the trains for Oldham, Royton and Rochdale *via* Shaw, a route which carries a considerable number of trains. Nos. 9 and 10 are used for Ashton and Stalybridge trains. In each case the pairs of lines devoted to a particular traffic are on either side of a double-faced platform, so that there is little risk of confusion, and one set of gates provides sufficient control, though a double set can be opened when required. It is only very infrequently that any change is made, so that regular passengers



HUNT'S BANK ENTRANCE.

Digitized by Google

know to which platform to proceed. Although there are certain standard arrangements as to the allocation of platforms Nos. 11–16 for particular traffics, there are many variations, due largely to the occasional need for diverting a particular train to a platform other than the usual one, because it is wanted for another service. In the main, however, express and fast trains *via* Rochdale, which include through services from Newcastle, Scarborough, York, Hull, Normanton, Wakefield, Leeds, Bradford and Halifax, run either to No. 11 or No. 14, the former rather more frequently, particularly in the case of those which continue through to Liverpool.

A good proportion of the Southport trains also start from No. 11, though it is somewhat strange to find that, during the busy 5–6 p.m. hour, one or two start from No. 12, which already deals with a remarkable series of expresses for the Blackpool and Fleetwood routes.

In the case of the 5.40 p.m. to Southport, its despatch from No. 12 avoids further delay due to the detachment of the Bradford portion of the 3.50 p.m. from Leeds, due in No. 11 at 5.23 p.m. Similarly, the 5.22 p.m. Southport train, which also uses No. 12, is thus clear of the 5.15 p.m. to Blackburn.

No. 12 usually deals with the Blackpool and Fleetwood trains, though it takes also a number of the through-services to Preston, with through-carriages for Edinburgh, Glasgow, Windermere, Morecambe, Barrow, &c., besides occasional Southport trains as mentioned. It also accommodates most of the through-services from London (Euston) to Blackburn, Colne, &c., and, in one way or another, is probably the busiest of the east-west platforms.

No. 13 receives most trains from Liverpool and Southport, though some go to No. 16, so that, in the case of through services, these platforms also despatch many of the Yorkshire departures. There are, however, several instances of trains for Rochdale and beyond starting from No. 12 in the reverse direction, as it is signalled, as are others, for use in both directions, if desired. No. 14 constitutes a relief to Nos. 11 and 12 for east-west traffic, while Nos. 15 and 16, particularly the latter, become very busy at times with trains from the Blackpool direction and from Southport, and now and then from Liverpool. Besides these, there are the through-services from and to Colne and Blackburn, to and from Euston *via* Manchester (Victoria) and Stockport, Midland Division trains *via* Hellifield, and a

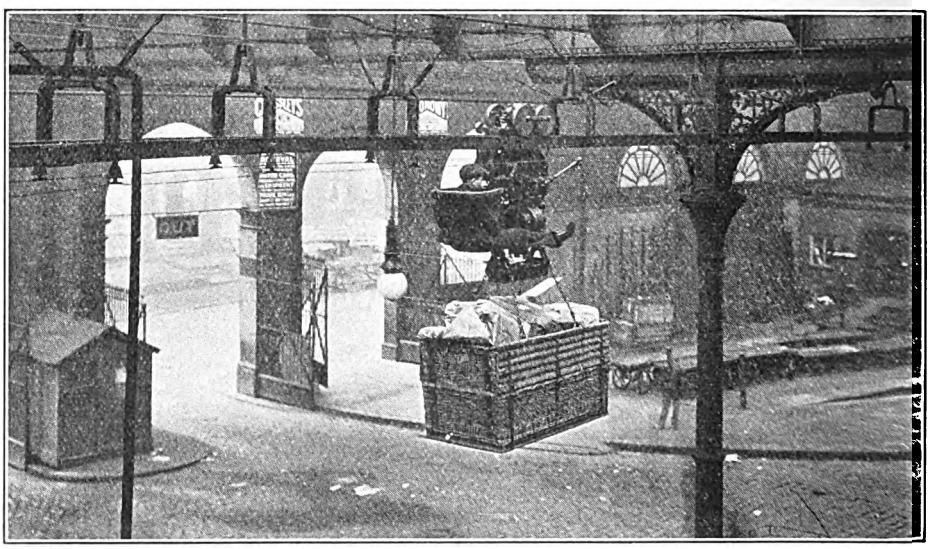
VIEW OF CIRCULATING AREA.

Digitized by Google

miscellaneous series of local trains, both east and west, on routes which are not allocated specifically to Nos. 1-10, including, of necessity, those working west of Victoria, in that there are no terminal platforms to accommodate them.

There are, however, some interesting variations from the standard arrangements, and, instead of considering the more interesting features of main services dealt with at Victoria station on the basis of platforms, it will be best to review the more notable items according to routes.

Dealing with arrivals from the east, the general rule is broken by the first train calling for attention, this being the 5.16 a.m. at No. 14, a service from the L.N.E.R. at York, with through carriages from York to Liverpool, which connects at Halifax with a semi-fast train from Leeds at 3.40 a.m. A stopping train from Bradford, due in No. 11 at 8.18 a.m., continues at 8.30 a.m. as a semi-fast for Liverpool. The 9.30 a.m. (9.25 a.m. on Saturdays) initiates the famous non-stop service between Manchester and Liverpool so far as the L. & Y. route is concerned. On week-days the 9.30 a.m. constitutes an extension of a Leeds and Bradford express due in No. 11 at 9.23 a.m. On Saturdays, however, the train is duplicated, the Leeds portion coming in at 9.22 a.m. and continuing non-stop to Liverpool at 9.25 a.m., while the Bradford portion arrives at 9.30 a.m., again at No. 11, and forms a second non-stop to Liverpool at 9.35 a.m. The next Liverpool express is the 10.50 a.m., which constitutes a continuation, except on Saturdays, of the Leeds and Bradford express, due in No. 11 at 10.45 a.m. This train is also served by the Hull and Wakefield train, due in at 10.35 a.m., which runs into No. 6, though on Saturdays it is sent to No. 11, to form the 10.50 in place of the Leeds and Bradford train. At 11.45 a.m. No. 11 receives a through-express from Hull to Manchester and Liverpool, with through-carriages from Hull (Riverside) to Preston, Manchester and Liverpool, in connection with the Zeebrugge Continental steamer, when running. This forms another non-stop to Liverpool, leaving at 11.50 a.m. At 12.27 p.m. a Leeds and Bradford express, again at No. 11, leaves at 12.35 p.m. non-stop for Liverpool, and on Saturdays there is a further express, originating in Manchester, at 1.35 p.m. from the same platform, for Southport, this being replaced on other days by a semi-fast at 1.50 p.m. At 2.30 p.m. a restaurant-car express from Leeds and Bradford to Liverpool uses No. 11 platform, leaving at 2.35 p.m., and, except on Saturdays, another Leeds and Bradford express arrives at 3.22 p.m.,



OVERHEAD CARRIER OVER STRANGEWAYS ENTRANCE YARD.

Digitized by Google

leaving for Liverpool at 3.30 p.m. At 4.17 p.m. a through-train from Newcastle and York to Manchester arrives at No. 14, this forming a relief to the regular train from York to Manchester due at 4.40 p.m. Neither of these continues through to Liverpool, but there is, intermediately, a Liverpool express from No. 11 at 4.30 p.m. At 5.23 p.m. (except on Saturdays) another Leeds and Bradford express arrives at No. 11 platform, leaving at 5.30 p.m. for Liverpool, and at 6.26 p.m. a similar train continues as 6.30 p.m. express to Liverpool. At 9.18 p.m. a restaurant-car express from Newcastle and York to Manchester and Liverpool is due, continuing at 9.23 p.m. as an express to Liverpool, but the train, in this case, is dealt with at No. 12 platform. The same arrangement applies in regard to the 9.35 p.m. for Liverpool, which constitutes the corresponding train on days other than Saturdays to that due on Saturday at 9.18 p.m., bringing through carriages from Hull to Manchester and Liverpool.

Besides these, mention may be made of a Bradford stopping train due at No. 11 at 8.18 a.m., which continues as a semi-fast for Liverpool; a Bradford stopping train due at No. 14 at 9.1 a.m.; a similar train due at No. 14 at 10.12 a.m.; a stopping train from Halifax due at No. 14 at 11.31 a.m.; a through train from York to Manchester due at No. 14 at 12.17 p.m.; a Wakefield stopping train due at No. 14 at 2.1 p.m.; a Saturday express from Bradford due at the same platform at 2.22 p.m., and a train from Scarborough and York due at No. 14 at 6.5 p.m.

Dealing now with trains in the opposite direction, No. 13 platform is principally concerned with through expresses from Liverpool to the east, but there are several interesting exceptions. Of the trains which are due at No. 13, the following may be mentioned :—

8.20 a.m. Fleetwood restaurant-car boat train to Bradford and Leeds, which on Mondays starts from Manchester.

9.20-9.25 a.m. Liverpool, Leeds and Bradford express.

10.25-10.30 a.m. (except Saturdays) Liverpool, Leeds and Bradford express.

11.40-11.45 a.m. restaurant-car express Liverpool to York and Newcastle.

12.20-12.25 p.m. Liverpool, Leeds and Bradford express.

1.20-1.35 p.m. Liverpool, Leeds and Bradford train.

2.25 p.m. Manchester to Leeds and Bradford.

2.35-2.40 p.m., Saturdays only, Liverpool to York.

2.45-2.50 p.m. Continental boat express to Hull (Riverside) and through train from Liverpool to Hull (Paragon) and York. On Saturdays replaced by a separate train at 2.50 p.m., conveying the Hull section, in view of the fact that the 2.40 p.m. departure takes the York portion on that day.

3.15-3.20 p.m. through train Liverpool to Leeds and Bradford.

3.48 p.m. Manchester to York.

4.25-4.30 p.m. Liverpool to Leeds and Bradford.

5.10 p.m. Manchester to York.

5.20-5.25 p.m. restaurant-car train from Liverpool to Leeds and Bradford

5.57 p.m. Manchester to York.

7.27-7.30 p.m. through train from Liverpool to York.

9.10-9.15 p.m. Saturdays, Liverpool to Leeds and Bradford.

9.25-9.32 p.m. Liverpool to Leeds and Bradford.

Besides the trains mentioned, and a few others of a secondary character also using No. 13 platform, the 4.30 a.m. from Manchester to Leeds, Bradford, York, &c., starts from No. 5, the 9.5 a.m. to Wakefield starts from No. 12, while the 9.50 a.m. on Saturdays, which is a through train from Manchester to Hull, York and Scarborough, starts from No. 13. At 10.5 a.m. a Saturday train for Hull leaves No. 12. On other days these two trains are replaced by one at 10.8 a.m. from No. 12, for York and Scarborough, conveying through carriages from Liverpool to Hull (Paragon). The 9.40 a.m. from Liverpool, due at Victoria at 10.25 a.m. (except on Saturdays), and continuing as an express for Leeds and Bradford, uses No. 13. At 2.32 p.m. (except on Saturdays) a stopping train for Halifax rather unusually runs from No. 4 platform. Otherwise, it will be seen that by far the larger proportion of the trains which provide express services between Liverpool and Manchester are dealt with at No. 11 or No. 13, according to direction, although there are exceptions and a somewhat greater variety in the case of main-line trains which work east of Manchester only.

In the case of Southport trains, a fair proportion of these also use No. 11, but occasionally such trains are found at other

Digitized by Google

platforms. Among those from No. 11 the following may be noted : 10.20 a.m., 11.20 a.m. and 12.15 p.m. trains every week-day, the 12.45 and 1.15 p.m. special Saturday-afternoon residential expresses, the 1.50 and 3.5 p.m. every-day trains, and the 5.0 and 6.10 special business expresses which do not run on Saturdays. The 4.8 p.m. to Southport leaves No. 14.

The evening residential service is also amplified by the 5.22, which runs from No. 12, as also the 5.40 p.m., a train which runs on Saturdays on an altered schedule. These two trains have already been explained. Mention may also be made of the 7.5 p.m., not Saturdays, which runs from No. 14, the 7.50 p.m. from No. 11, as also the 9 p.m. express, and the 10.15 p.m. from No. 11. In the opposite direction, the trains from Southport are fairly-well distributed, the morning arrivals from Southport being as follows: 8.11 a.m., No. 16 ; 8.44 and 8.56 a.m., No. 13 ; 9.25 a.m., No. 15 ; 9.57 and 10.10 a.m., No. 13. Later trains include the 11.3 a.m., No. 16, as also the 12.10 p.m. ; the 2.6 p.m. at No. 13 ; the 3.27 p.m. at No. 16 ; the 4.55 p.m. at No. 15; the 6.52 and 7.59 at No. 13; the 10.13 (10.24) on Saturdays at No. 15, and the 11.47 at No. 16.

Several of the Southport trains are made up with special car stock of the same kind as that used for the chief Blackpool residential expresses.

It is, however, the Blackpool and Fleetwood route trains which do most to render the main-line platforms at Victoria station busy, particularly when, as is not infrequently the case, they have to be amplified by relief and additional trains. In the main, trains for these routes are despatched from No. 12 platform, there being but few exceptions, and the fact that it is possible, now and then, to interpolate a Southport or other train and to deal also with some of the Anglo-Scottish and through London services at the same platform, explains why No. 12 must rank as the busiest platform, so far as east-west traffic is concerned. Including seasonal trains, such as those which are booked to run only during the height of the summer season, the following remarks will give some idea of the amount of traffic handled at this platform :—

a.m.		
7.40	S.O.	Fleetwood and Whitehaven.
7.50	N.S.	Do.
7.50	S.O.	Blackpool T.R.
8.20	S.O.	Do.
8.33	S.O.	Fleetwood and Isle of Man.
8.45		Do.
8.55		Blackpool C.
9.23	S.O.	Blackpool T.R.
9.40		Edinburgh, Glasgow and (N.S.) Whitehaven.
9.47	S.O.	Windermere and Whitehaven.
10.25		Blackpool C.
10.30	M.O.	Blackpool T.R. and Fleetwood.
10.30	S.O.	Do.
10.55	S.O.	Blackpool C.
11.10		Blackpool T.R. and Fleetwood.
11.25		Blackpool C.
11.55	S.O.	Do.
p.m.		
12. 8	S.O.	Do.
12.20	N.S.	Edinburgh, Glasgow and Blackpool C.
12.20	S.O.	Edinburgh and Glasgow.
12.50	S.O.	Blackpool C.
1. 0		Blackpool T.R.
1.20	S.O.	Blackpool C.
1.30		Morecambe, Whitehaven and Windermere.
1.40		Blackpool T.R., and Fleetwood.
1.50	F. & S.O.	Fleetwood and Isle of Man.
2.35	S.O.	Blackpool T.R., and Fleetwood.
3. 0		Edinburgh and Glasgow.
3.15		Blackpool T.R. and C., and Fleetwood.
3.55	S.O.	Blackpool C.
4. 0	N.S.	Do.
4.10		Blackpool T.R., and Fleetwood.
4.25		Blackpool C.
4.55	N.S.	Blackpool T.R., and Fleetwood.
5. 2	N.S.	Blackpool C.
5.10	N.S.	Do.
5.45	N.S.	Blackpool T.R., Fleetwood and Morecambe.
5.55	N.S.	Blackpool C.
6.38		Do.
7. 0		Blackpool T.R. and C., and Fleetwood.
8.15		Do.
9. 5		Belfast restaurant-car boat train to Fleetwood.
10.30		Thursdays and Saturdays only to Blackpool C.

There are a few other incidental trains, such as some of those bringing through carriages from London (Euston) to Manchester (Victoria), and continuing to Blackpool, Colne, &c., and an occasional train on other services. It will be readily appreciated, therefore, that at all busy periods trains are coming into and leaving No. 12 platform practically as fast as they can be handled. This is further notable, in that they come in empty and usually go out with a full load, so that three or four, if not five, minutes' platform occupancy

Digitized by Google

is involved in each case. At the hours of business travel, most of the Blackpool trains are made up of semi-open cars, while the 5.10 p.m. includes club cars and is, therefore, known as the Blackpool Club train.

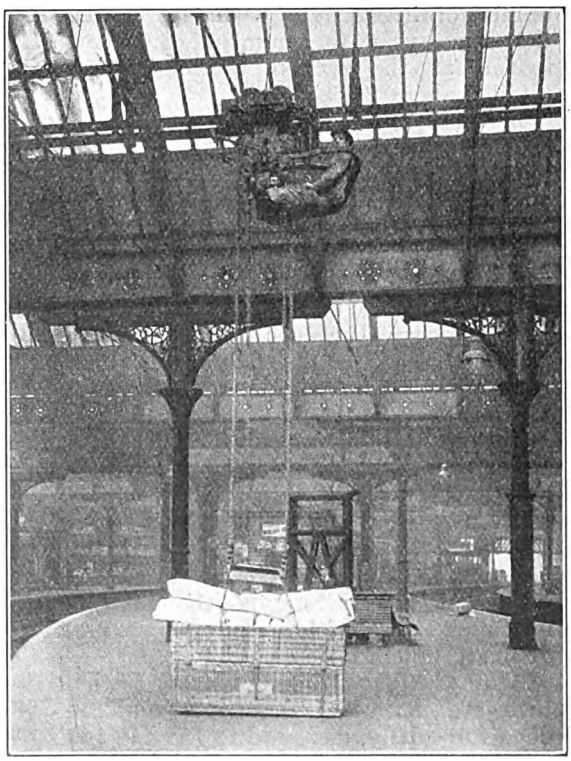
As in the case of Liverpool and Southport trains, there is rather greater variety in the platforms used by trains arriving from the Blackpool direction, so that it will be sufficient to mention merely the principal arrivals and the platforms used, with an occasional note as necessary :—

7.35 a.m. No. 13, Belfast restaurant-car boat train, Fleetwood to Leeds (Monday excepted) ; 8.36 a.m., No. 16 ; 8.50 a.m., No. 15 ; 9.5 a.m., No. 16 ; 9.16 a.m., No. 13 ; 9.30 a.m., No. 13 ; 9.32 a.m., No. 16 ; 9.40 a.m., No. 13 ; 9.53 a.m., with through-carriages from Blackpool to Rochdale, No. 15 ; 9.58 a.m. from Barrow to Morecambe, No. 16 ; and 10.55 a.m., No. 13. Some of these trains do not run on Saturdays, and this also applies to the substantially complete list following, which includes all arriving at No. 16 :—

12 noon ; 12.27 p.m. ; 1.27 p.m. ; 1.32 p.m. ; 1.43 p.m. (Isle of Man boat train) ; 1.49 p.m. (from Morecambe) ; 2.16 ; 2.36 p.m. (from Edinburgh and Glasgow) ; 3 p.m. ; 3.8 p.m. ; 3.13 p.m. ; 3.35 p.m. ; 3.45 p.m. ; 3.50 p.m. ; 3.54 p.m. ; 4.8 p.m. ; 4.12 p.m. ; 4.27 p.m. (from Glasgow) ; 4.35 p.m. ; 4.38 p.m. ; 4.57 p.m. (from Barrow) ; 5.24 p.m. ; 5.57 p.m. ; 6.57 p.m. ; 7.5 p.m. (from Morecambe) ; 7.16 p.m. ; 8.10 p.m. ; 8.40 p.m. ; 8.57 p.m. (Isle of Man boat train) ; 9.21 p.m. (from Morecambe) ; 9.39 p.m. ; 10.45 p.m. ; and 12.23 a.m.

The foregoing list becomes as heavy as it is, of course, largely because of the number of "Saturdays only" trains included. A large proportion is, however, left, even when the special pressure of that day is allowed for, so that, in one way or another, platforms Nos. 13, 15 and 16 have to deal with a very frequent service of arriving trains during the morning pressure period, and during the summer months they are kept fairly busy, especialy No. 16, not only on Saturdays, but also on each week-day. The situation is, in fact, analogous to that of No. 12, in that train after train has to be received, unloaded of its passengers, and sent off empty, sometimes with an actual headway of not more than five minutes.

Besides the standard trains, there are a few parcels and milk trains, generally dealt with at Nos. 11, 16 and 17 platforms, and one or two exceptional services, such as early morning newspaper trains for Liverpool and a newspaper train leaving No. 11 platform at 9.30 p.m. to catch the Belfast steamer at Fleetwood. In addition to trains from and to the L.N.W. section passing through the station on Nos. 17 and 18 through lines, many goods and mineral trains of both sections pass through, also light engines. No. 19 line is used as a siding for engines, particularly those associated with such trains as actually terminate and reverse at platforms Nos. 11-16, with one or two engines in reserve or ready to provide banking



OVERHEAD CARRIER LIFTING BASKET FROM PLATFORM.

Digitized by Google

assistance up the steep incline to Miles Platting.

There are several sets of sidings in the vicinity of signal boxes associated with Victoria station and within a radius of a mile or two, to and from which many of the trains, normally terminating or starting there, actually work. These have the following capacities :—

	No. of Tracks.	No. of Bogie Vehicles.
Queen's Road (near Crumpsall)	10	94
Cheetham Hill..	8	65
Newtown (towards Miles Platting)	7	41
Millgate	5	16
Irwell Bridge	2 loops	20
Salford	8	54
Irlam	8	89
Red Bank	22	266

It is some years since a census of passengers using Victoria station was taken, but a complete week in October, covering a representative normal period, showed that about 522,000 passengers arrived at and left the station, the departures, rather curiously, substantially exceeding the number of those arriving each day. During the same year the number of tickets issued at the station booking offices totalled about 2,558,500.

In winter about 390 booked passenger trains are due to arrive and 370 to leave, these totals being increased by about 30 under each heading in summer. These figures do not, however, take into account the very large numbers of excursion, relief, duplicating and divisional trains which are operated on Saturdays, Sundays and Mondays throughout the summer months, or the still larger numbers which are required at holiday periods, especially for the Blackpool traffic. It is interesting in this connection to recall that the regulation system which has done so much to reduce the overcrowding and discomfort which so often attended travel to and from Blackpool at week-ends and at public holidays, was first introduced to meet conditions at Victoria station, though it is now applied also, with conspicuous success, at many other stations.

At the neighbouring Exchange station there are, normally, 135 arrivals and 140 departures daily, increased to 155 and 149 respectively in summer, again without counting excursions, relief trains, &c.

As indicating the tremendous volume

MR. J. G. HOPWOOD,
Stationmaster.

of the special holiday traffic dealt with at busy periods, the additional trains scheduled for two representative Saturdays last year may be summarised. One was at the beginning of September, and may be thus analysed : 64 were booked to pass without calling, these including L.N.W. section trains, with a number of L. & Y. section trains conveying excursion and holiday passengers between other stations and which travelled *via* Victoria for operating convenience or of necessity. Trains starting their journey at Victoria station numbered 25, while 37 terminated there. There were also 9 trains which were scheduled to arrive at and leave Victoria station in the course of their journeys.

Of the total of 135 trains thus operated as additions to normal services, no fewer than 33 were for the various Blackpool stations, with 36 bringing return traffic therefrom, besides a number for Fleetwood, Southport, Morecambe and the Lake District, and some to Scarborough and Llandudno. Among the unusual items, presumably covering week-end period excursion arrangements outwards and home, may be noted trains between Aberystwyth, Bournemouth, Penzance and Colne, St. Pancras and Blackpool, Yarmouth and Manchester.

Digitized by Google

It is, however, the Saturday preceding August Bank Holiday which is the busiest day of the year, though owing to the number of additional trains in the public timetables, the number of specials on July 31 last increased only to 140, of which 47 were for Blackpool stations and 36 arrivals therefrom, though some of these were empty trains returning for another load.

Attached primarily to Victoria Station is a staff numbering about 380 persons. These include 12 clerks, 14 station inspectors; 18 yard inspectors and foremen; 23 shunters; 5 foremen collectors, 49 collectors and 4 excess luggage collectors; 44 foremen, leading and ordinary parcels porters; 66 ordinary porters; 13 leading, ordinary and junior cloakroom attendants; 52 guards; 49 signalmen; 4 relief signalmen; 20 signal-box lads and 3 relief lads; 5 station and signal linemen. At Exchange there are 2 chief inspectors; 5 station inspectors; 2 parcels inspectors; 2 clerks; 1 station foreman; 17 collectors; 4 excess luggage collectors; 54 ordinary and 32 parcels or parcels post porters; 7 yard foremen; 8 shunters; 8 signalmen; 2 cloakroom attendants; 1 signal lampman and 35 guards, the total being 180.

A very complete system of fire-protection is in force. The station fire brigade consists of 20 men, and test calls are made now and then. The ambulance movement is also strongly supported, and both the fire brigade and the ambulance parties have gained high honours in inter-railway and other competitions.

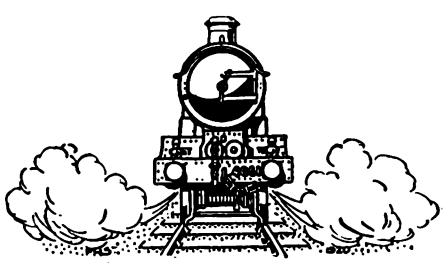
Mr. J. G. Hopwood is Stationmaster at Victoria, having charge also of Exchange and Salford. There are two Assistant Stationmasters, Mr. A. Whittingham and Mr. J. Speakman. There are also two Chief Inspectors, Mr. G. Caldwell and Mr. C. A. Morris. The Parcels Department is under Mr. T. France, who is also responsible for work at London Road and Exchange stations.

Mr. T. Fitton, Passenger Agent, is in charge of the Booking Offices at Exchange, Victoria and Salford. He has a staff at Victoria of 34, at Exchange 15, at Salford 2, and at Ordsall Lane 1. Wages of station staff and superannuation allowances are also made through a section of his office. Here, also, about 1,800 weekly season-tickets are issued.

The Left Luggage Office comes under the general oversight of Mr. Hopwood. This department handles about 280,000 items annually. Mr. Cattle, clerk in charge, is also secretary of the Sports Club.

Mr. Hopwood, after obtaining general experience, held stationmasterships at Bury, Rochdale, Blackburn and Blackpool (Talbot Road) before going to Victoria in April, 1926.

In conclusion, the writer would express his indebtedness to officers of the L.M.S.R., and to Mr. Hopwood, Mr. Whittingham and others, who gave him much information and in other ways assisted in enabling him to observe and describe Manchester's largest and most interesting railway station.



Digitized by Google

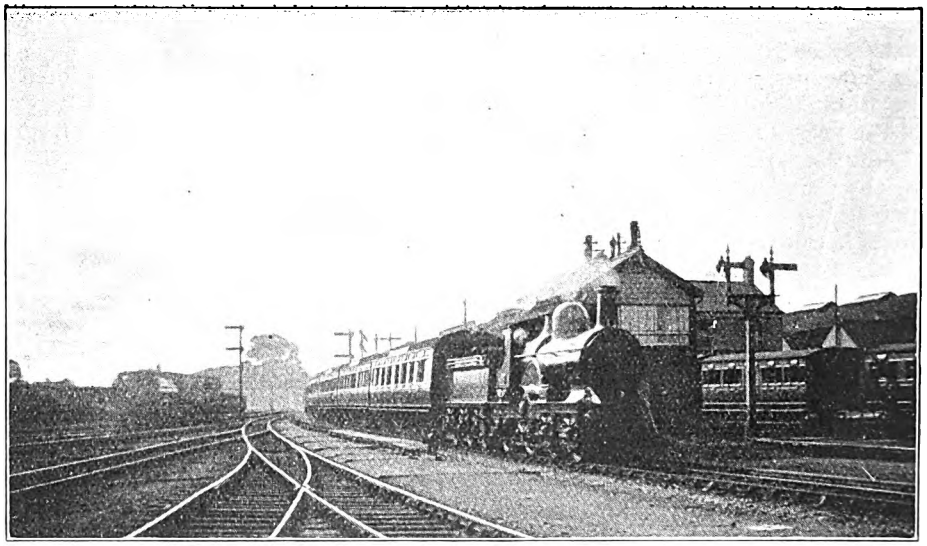


Photo.] [*Capt. F. S. Watson.*

4-2-2 LOCOMOTIVE No. 3051 "STORMY PETREL" ON UP EXPRESS.

Modern Locomotive Practice on the Great Western Railway. [No. I.]

By F. W. BREWER, A.I.Loco.E.

DURING 1915 and 1916 the late Mr. E. L. Ahrons dealt very exhaustively with "Locomotive and Train Working in the Latter Part of the Nineteenth Century" on the Great Western Railway. Owing to the limitation of his subject-matter imposed by the title, however, these articles did not deal with locomotives of later date, so that, in some respects, the present contributions can be considered as constituting the linking up of Mr. Ahrons' articles with the period that has elapsed since the abolition of the broad gauge.

Interesting as were locomotive matters connected with this line in the period covered by Mr. Ahrons, it is not too much to say that the subsequent developments have been of an equally, if not a more, noteworthy and enterprising character. A railway, such as the Great Western, which has held the record for high speed and long-distance running in Great Britain, may fairly claim to have achieved a good deal in the way of locomotive design and train working during the past 35 years.

In the present series of articles, it should, however, be noted that only the more notable and important types of engines, and only those belonging to the G.W.R. proper, will be referred to, and there will be no attempt to compile a complete history of Great Western locomotives, as to do so would occupy too much time and space. Nevertheless, all necessary details will be given, together with lists of the various classes of engines. In short, much interesting information, based, for the most part on official data, has been gathered together.

As regards express passenger train working, there were in 1892 comparatively few runs booked at 50 m.p.h., or over. By 1894, an appreciable increase in these had been instituted, and in 1898 there were over 40 trains timed at from roughly 50 to 53¼ m.p.h. Of these, there were a dozen non-stop trains covering more than 100 miles: two to Exeter, 193¾ miles;

Digitized by Google

one to Birmingham, 129¼ miles (in both cases by the then longer routes to these places); two to Bristol, 118½ miles; six to Bath, 107 miles; and one from Leamington to London, 106 miles. There was also one train which did the journey from Newport to Paddington, 143 miles, without a stop, at an average speed of 49·2 m.p.h. The daily non-stop run to Exeter had, by the way, been inaugurated in July, 1896. Some years later, namely, on July 1, 1904, the now famous "Cornish Riviera" express was first put into service, and the long-distance non-stop running was extended to Plymouth, then 245¾ miles from London. At that time, and until 1906, this express ran in the summer only. In the last-mentioned year it ran in the winter months also, thus becoming a week-day "all-the-year-round" service.

By the opening of the new route *via* Westbury in 1906, the distance to Exeter was reduced to 173¾ miles, and that to Plymouth to 225¾ miles. Similarly, in 1910, the run from Paddington to Birmingham was shortened from 129¼ miles to 110¼ by the completion of the Ashendon and Aynho line, which gave the Great Western the shortest journey between London and Birmingham, and which enabled the Company to put into running, on July 1, 1910, the first of the now well-known two-hour expresses between these points. All these were very remarkable changes and improvements, and the result has been to place the Great Western in the forefront of British railways in the matter of high average speeds as a regular and every-day achievement. There are now several trains booked at over 55 m.p.h., while three are timed at 58·8, two at a little over 61, and one, the 3.45 p.m. *ex* Swindon to Paddington, at 61·8, or practically 62. The "Cornish Riviera's" average speed to Plymouth is 56·2 m.p.h.; but, to (passing) Exeter, 173¾ miles, it is no less than 59. Down to the end of 1895, the Great Western's chief stumbling block to the institution of better speeds and better train services had undoubtedly been the compulsory stop at Swindon; hence the removal of this restriction early in 1896 had in that year enabled Bristol to be reached from London in 2¼ hours; Exeter in 3 hours 50 min.; and Plymouth in 5¼ hours. As long ago as 1889, 4¼ hours were taken to get to Exeter, as compared with 175 min. at the present day; and the time even to Plymouth, by the Cornish Riviera express is now the level 4 hours. The modern route to both Exeter and Plymouth by this train is, of course, 20 miles shorter than that of 1889.

In 1892, before many of Mr. William Dean's celebrated 7-ft. 8-in. single-wheelers had been built, the bulk of the express traffic was still being worked by sixty-three 7-ft. singles, a smaller proportion of the traffic falling to the various classes of coupled engines possessed by the Company. For their size the 7-ft. 2-2-2's were remarkably smart little engines, more especially those with 18-in. cylinders. The achievement of No. 162, *Cobham*, in covering the 129¼ miles to Birmingham, with a load of 160 tons, in 2 hr. 12 min. 8 sec., or at an average speed of 58·7 m.p.h., will always be regarded as highly creditable. Allowing for the time lost by two slacks, and the slowing down and restarting at signal checks, the net time was computed to be only 123 min. 34 sec., but as such an estimate may possibly err, the figures first given are good enough. Another of the 7-ft. singles, hauling the comparatively heavy load of 250 tons, did the journey from Swindon to Paddington, 77¼ miles, in 86½ min.; and another, with 225 tons, ran the 63½ miles, London to Oxford, in 76 min., each of which performances was distinctly excellent for engines having 18 in. by 24-in. cylinders, and about 15½ tons adhesion weight. The Oxford, Birmingham and Birkenhead expresses were frequently worked by these engines. Two, rebuilt with Belpaire fireboxes, ran the 4.55-p.m. *ex* Paddington to Birkenhead down to 1905. A dining car was attached to the train in 1903, by which the total weight of the coaches was increased to 232¼ tons, and, as the booked speed was 53 m.p.h., the train was double-headed as far as Oxford. There the Wolverhampton portion was taken off. From Oxford the load was 188 tons to Banbury, at which point a 21-ton composite was slipped, and, subsequently, at Leamington, two more carriages were dropped. So far as official data are available the above 7-ft. singles with Belpaire boilers had 180 lb. steam pressure, and an adhesion weight of nearly 15¾ tons. Although only a few performances by this

Digitized by Google

type have been cited, they are, I think, sufficiently representative.

The withdrawal from service of the different classes of 7-ft. 2-2-2's was not so rapid as might be supposed, having regard to the large number of the 7-ft. 8-in. engines—eighty—which were eventually built at Swindon. The scrapping covered a period of about seventeen years, and the breaking up of the last eight was apparently contemporaneous with that of some of the 7-ft. 8-in. 4-2-2's themselves. One of the 7-ft. singles was cut up in 1898, and two were condemned in 1900; seven in 1903; eight more in 1904; ten in 1905; eight in 1906; and one in each year in 1907, 1912, 1914 and 1915. Of the remainder, according to information kindly supplied me by Mr. C. B. Collett, the present Chief Mechanical Engineer, twenty-three were converted to 5-ft. 2-in. 0-6-0 goods tender engines in 1900–1902, and were scrapped as such during the years 1903 to 1920, inclusive. Between 1900 and 1910 about a dozen of the 7-ft. singles were rebuilt with Belpaire fireboxes, some with domed, and some with domeless boiler barrels. Except in the case of No. 1124, which was provided with a domed Belpaire boiler in 1910, no official records were kept of these rebuilds. In addition to No. 1124, the following other engines were, it is believed, fitted with Belpaire fireboxes:—Nos. 159, 160, 163, 165, 1000, 1117, 1120, 1122, 1125, 1129, and 1130. As altered in 1910, No. 1124 had a domed boiler 4 ft. 5 in. in diameter outside the larger ring, by 11 ft. long. The tube heating surface was 1,168·88 sq. ft., and that of the firebox 113·86 sq. ft., making a total of 1,282·74 sq. ft. Grate area, 17·2 sq. ft.; steam pressure, 180 lb. per sq. in. The cylinders were, as before, 18 in. by 24 in. With new tyres the

G.W.R. ENGINES.

LIST OF 7-FT. SINGLE-WHEEL EXPRESS ENGINES, WITH DATES WHEN SCRAPPED.

No.	Year Built, as 7 ft.	Size of Cylinders.
*9	1890	18 in. by 26 in.
*10	1890	18 in. by 26 in.
55	1873	18 in. by 24 in.
157–166	1879	18 in. by 24 in.
378–387	1866	17 in. by 24 in.
471–480	1869	17 in. by 24 in.
577–586	1869	17 in. by 24 in.
999	1875	18 in. by 24 in.
1000	1875	18 in. by 24 in.
1116–1133	1875	18 in. by 24 in.

* Formerly 7 ft. 8 in.

SCRAPPED AS 2–2–2's, 1898–1915.

No.	Broken Up.	No.	Broken. Up.
378 ..	1898	55	1905
		158	1905
383 ..	1900	160	1905
479	1900	166	1905
		1117	1905
157 ..	1903	1118	1905
161 ..	1903	1120	1905
382 ..	1903	1131	1905
386 ..	1903	1132	1905
		10	1906
478 ..	1903	159	1906
1116 ..	1903	163	1906
		1000	1906
1126 ..	1903	1119	1906
162 ..	1904	1123	1906
164 ..	1904	1125	1906
579 ..	1904	1129	1906
999 ..	1904	1130	1907
1121 ..	1904	1124	1912
1122 ..	1904	1128	1914
1127 ..	1904	165	1915
1133 ..	1904	—	—
9 ..	1905	—	—

CONVERTED TO 0–6–0's, 1900–1902, AND SCRAPPED 1903–1920.

No.	Broken. Up.	No.	Broken. Up.
387 ..	1903	577	1915
582 ..	1904	381	1919
384 ..	1905	474	1920
581 ..	1905	—	—
583 ..	1905	—	—
585 ..	1905	—	—
580 ..	1906	—	—
473 ..	1907	—	—
475 ..	1907	—	—
578 ..	1907	—	—
379 ..	1909	—	—
385 ..	1910	—	—
586 ..	1910	—	—
380 ..	1911	—	—
480 ..	1911	—	—
584 ..	1911	—	—
471 ..	1912	—	—
472 ..	1914	—	—
476 ..	1914	—	—
477 ..	1914	—	—

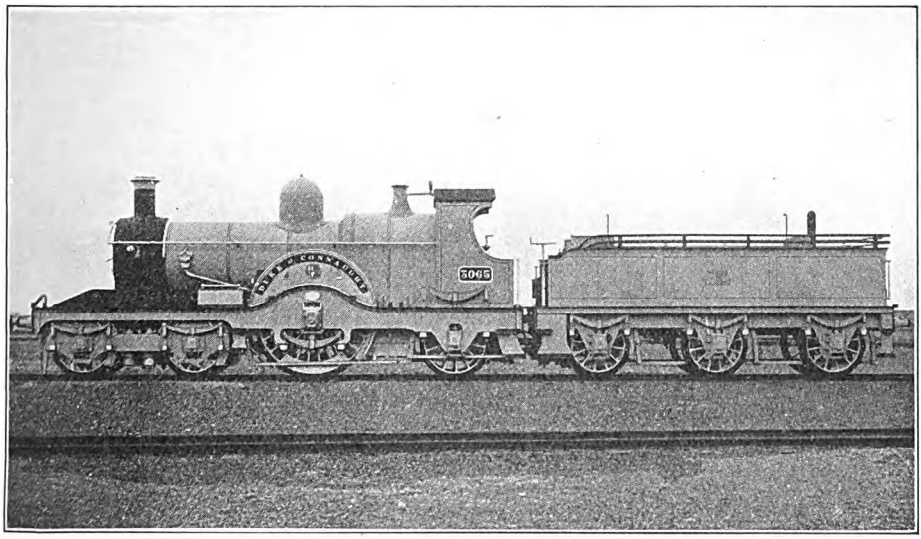
Digitized by Google

driving wheels were 7 ft. 1½ in., and the leading and trailing wheels 4 ft. 1½ in. The total weight of the engine was 38 tons 12 cwt., of which 15 tons 13 cwt. were available for adhesion. Tractive force at 85 per cent. of the boiler pressure, 13,925 lb. Weight of 3,000-gallon tender, 36¾ tons. This engine was broken up in 1912.

The accompanying list shows when the sixty-three engines (including those rebuilt as 0-6-0's) underwent a like fate. From this list it will be seen that No. 162, *Cobham*, (constructed in 1879, and afterwards renewed) was condemned in 1904.

With the introduction of Mr. Dean's 7-ft. 8-in. engines, however, a new epoch in the history of Great Western locomotive practice began. Mr. Dean had been appointed locomotive superintendent in 1877, and he retained office until 1902, when Mr. G. J. Churchward became his successor—as Chief Mechanical Engineer. Mr. Churchward resigned in 1922, and the position was then given to Mr. C. B. Collett, O.B.E., who had acted as deputy since 1919, and who has worthily continued the progressive policy set up by his predecessors.

As already stated, 80 of the above-mentioned single-wheelers (numbered 3001-3080) were built at Swindon. The first eight of these engines were Nos. 3021-3028, which were constructed on Mr. Dean's convertible plan for the broad gauge in 1891, and these were of the 2-2-2 type with inside frames. After the abolition of that gauge in 1892, Nos. 3021–3028 were adapted to the 4-ft. 8½-in. gauge, the axles being shortened and the frames placed outside the wheels. These eight engines then corresponded with two others, Nos. 3029 and 3030, which had also been built in 1891, but for the latter gauge. In the following year, Nos. 3001-3020 were turned out. It was said that this batch of twenty 2-2-2's had previously been ordered for the standard gauge, but that the completion of the engines had been delayed so as to expedite the construction of the eight "convertibles." Hence, the apparent conflict between the running numbers and the dates. The first thirty of the 7-ft. 8-in. singles were, it will be noted, six-wheeled engines. All of them at that time had 20-in. by 24-in. cylinders, 1,444·92 sq. ft. of heating surface, and 160 lb. pressure. The driving wheels carried a load of 19 tons, and the weight of the engines was 44 tons 2 cwts. The engine wheel base was rather long—18 ft. 6 in.—in consequence of which the leading axle-boxes were given a lateral play of 2 in. As a result of No. 3021 *Wigmore Castle* running off the rails

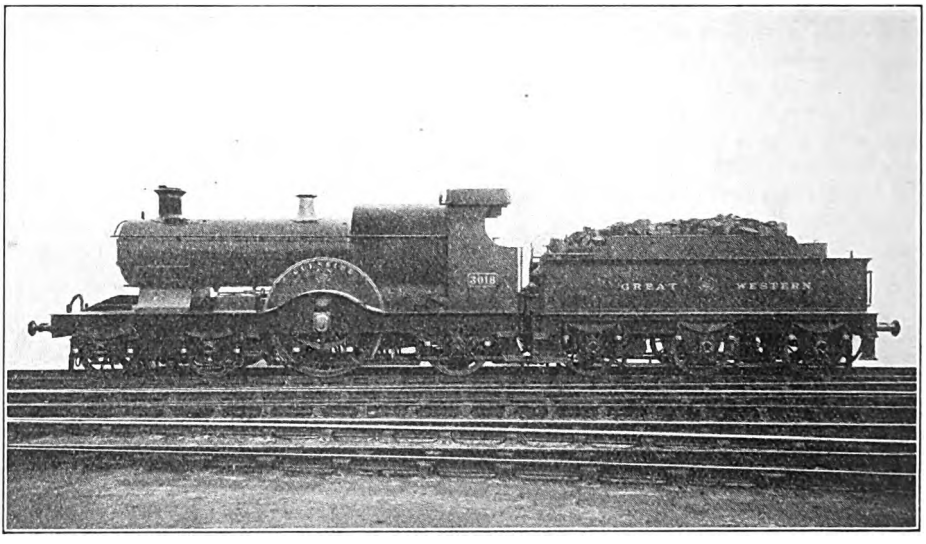


4-2-2 LOCOMOTIVE No. 3065, "DUKE OF CONNAUGHT" AS ORIGINALLY BUILT.

Digitized by Google

while passing through the Box tunnel with an express train on September 16, 1893, it was decided to replace the single leading carrying axles by four-wheeled bogies with outside frames, and with the bogie wheels spaced 7 ft. between centres. The next lot of the 7-ft. 8-in. singles were accordingly of the 4-2-2 type, and the first of these was No. 3031 *Achilles*, built in March, 1894. The cylinders of this engine, and those of its successors, were made 19 in. by 24 in., and the weight on the driving wheels was reduced to 18 tons. The total heating surface was increased to 1,561·13 sq. ft., and the weight of the engines to 49 tons. Commencing in 1894, the thirty 2-2-2's were also fitted with leading bogies and with 19-in. by 24-in. cylinders.

In 1894, there were twenty of the 7-ft. 8-in. engines in steam daily. Seven were stationed at Paddington, eight at Bristol, and five at Newton Abbot. The London and Bristol set worked between Paddington and Bristol, and vice versa, and the Newton Abbot engines between the latter place and Bristol. Some of the Bristol lot also ran to Newton Abbot. Taking the coal consumption for the two years ended June, 1894, and including the quantity used for lighting up, it was found that the seven London engines averaged 31 lb. per mile; the eight engines in the Bristol link, 33 lb.; and the five at Newton Abbot, 31·8 lb. In round figures, the loads varied from 150 tons to 200 tons. As the second example of the "Achilles" class was not turned out until July, 1894, these engines would be of the six-wheeled type, with the possible exception of *Achilles* itself. In later years, the 7 ft. 8 in. singles ran the non-stop trains to Exeter, work which involved the ten miles' stiff climb to Whiteball summit (between Bristol and Exeter), most of the last portion of which ascent is at 1 in 81. They also later took their share of working the relatively heavy Oxford and Birmingham traffic, the loads sometimes being well over 200 tons. It will be recalled that it was one of these 4-2-2's, No. 3065 *Duke of Connaught*, which took part in the memorable record run on May 9, 1904, when an average speed of no less than 71·3 m.p.h. was maintained by this engine from Bristol to Paddington, with a load behind the tender of 120 tons.



4-2-2 LOCOMOTIVE No. 3018 "GLENSIDE," REBUILT WITH BELPAIRE DOMELESS BOILER.

By 1908, however, owing to the increased weight of the trains, it was recognised that these otherwise excellent single-wheelers necessarily had their limitations, and consequently, their disappearance was merely a question of time. The G.W.R. had by then a large number of very efficient

Digitized by Google

4-4-0's, to say nothing of 56 large 4-6-0's (36 with two cylinders, and 20 with four cylinders), together with 15 "Atlantics," one of which was of the four-cylinder type. There were also three 4-4-2 "de Glehn" four-cylinder compounds. Anyway, in 1908, a beginning was made with the scrapping of the 7-ft. 8-in. engines, 15 of which were then broken up. The withdrawal of the class as a whole was, nevertheless, a gradual one, and the last four of the engines were condemned in 1915. A complete list of the class, living the dates when the engine were built and scrapped, respectively, is appended.

G. W. R.

LIST OF 7-FT. 8-IN. SINGLES, 4–2–2 TYPE.

No.	Name.	Date Built.	Date Scrapped.
3001	*Amazon* ..	Jan., 1892	June, 1908
3002	*Atalanta* ..	,,	Sept., 1908
3003	*Avalanche* ..	Feb., 1892	Feb., 1909
3004	*Black Prince* ..	,,	Oct., 1911
3005	*Britannia* ..	,,	Feb., 1908
3006	*Courier* ..	Mar., 1892	Feb., 1914
3007	*Dragon* ..	,,	Mar., 1912
3008	*Emperor* ..	,,	Aug., 1912
3009	*Flying Dutchman*	,,	Feb., 1914
3010	*Fire King* ..	,,	Sept., 1908
3011	*Greyhound* ..	,,	Sept., 1911
3012	*Great Western* ..	,,	May, 1909
3013	*Great Britain* ..	,,	Feb., 1914
3014	*Iron Duke* ..	April, 1892	June, 1908
3015	*Kennet*	,,	June, 1908
3016	*Lightning* ..	,,	Mar., 1911
3017	*Prometheus* ..	,,	Sept., 1908
3018	*Racer* (*a*) ..	,,	June, 1913
3019	*Rover*	,,	Sept., 1908
3020	*Sultan*	,,	Feb., 1908
3021	*Wigmore Castle*	April, 1891	May, 1909
3022	*Bessemer* ..	May, 1891	Feb., 1909
3023	*Swallow* ..	July, 1891	Sept., 1912
3024	*Storm King* ..	,,	Feb., 1909
3025	*St. George* ..	Aug., 1891	Sept., 1908
3026	*Tornado* ..	,,	Feb., 1909
3027	*Worcester* ..	,,	July, 1914
3028	*Wellington* ..	,,	Feb., 1909
3029	*White Horse* ..	Nov., 1891	May, 1909
3030	*Westward Ho* ..	Dec., 1891	May, 1909
3031	*Achilles* ..	Mar., 1894	July, 1912
3032	*Agamemnon* ..	July, 1894	Oct., 1913
3033	*Albatross* ..	,,	July, 1911
3034	*Behemoth* ..	,,	Oct., 1908
3035	*Beaufort* ..	,,	May, 1909
3036	*Crusader* ..	Sept., 1894	Mar., 1911
3037	*Corsair* ..	,,	Oct., 1908
3038	*Devonia* ..	,,	Oct., 1908
3039	*Dreadnought* ..	,,	July, 1915
3040	*Empress of India*	,,	Mar., 1912
3041	*The Queen* (*b*) ..	Oct., 1894	Nov., 1912
3042	*Frederick Saunders*	,,	Jan., 1912
3043	*Hercules* ..	Jan., 1895	Oct., 1913
3044	*Hurricane* ..	,,	Oct., 1908
3045	*Hirondelle* ..	Jan., 1895	May, 1914
3046	*Lord of the Isles*	,,	Oct., 1908
3047	*Lorna Doone* ..	Feb., 1895	Nov., 1912
3048	*Majestic* ..	,,	June, 1913
3049	*Nelson* ..	,,	July, 1913
3050	*Royal Sovereign*	,,	Dec., 1915
3051	*Stormy Petrel* ..	,,	Nov., 1912
3052	*Sir Walter Raleigh*	Mar., 1895	Sept., 1913
3053	*Sir Francis Drake*	,,	Sept., 1911
3054	*Sir Richard Grenville*	,,	Oct., 1911
3055	*Trafalgar* (*c*) ..	,,	Feb., 1914
3056	*Timour* (*d*) ..	,,	Oct., 1914
3057	*Tartar* (*e*) ..	April, 1895	Sept., 1912
3058	*Grierson* ..	,,	Feb., 1912
3059	*Voltigeur* ..	,,	June, 1913
3060	*Warlock* ..	,,	Mar., 1915
3061	*Alexandra* ..	May, 1897	Dec., 1912
3062	*Albert Edward*	,,	April, 1915
3063	*Duke of York* ..	June, 1897	Jan., 1912
3064	*Duke of Edinburgh*	,,	Sept., 1911
3065	*Duke of Connaught*	July, 1897	Oct., 1914
3066	*Duchess of Albany*	Dec., 1897	Oct., 1913
3067	*Duchess of Teck*	,,	Dec., 1914
3068	*Duke of Cambridge*	Jan., 1898	Nov., 1912
3069	*Earl of Chester*	,,	June, 1912
3070	*Earl of Warwick*	Feb., 1898	Oct., 1914
3071	*Emlyn*	,,	Oct., 1914
3072	*North Star* (*f*) ..	June, 1898	Aug., 1912
3073	*Princess Royal*	,,	Oct., 1912
3074	*Princess Helena*	,,	Dec., 1915
3075	*Princess Louise*	July, 1898	June, 1912
3076	*Princess Beatrice*	Feb., 1899	July, 1912
3077	*Princess May*	,,	Nov., 1912
3078	*Shooting Star* (*g*)	,,	Nov., 1911
3079	*Thunderbolt* ..	,,	Sept., 1911
3080	*Windsor Castle*	Mar., 1899	Oct., 1913

(*a*) Renamed *Glenside*. (*b*) Renamed *James Mason*. (*c*) Renamed *Lambert*. (*d*) Renamed *Wilkinson*. (*e*) Renamed *Walter Robinson*. (*f*) Renamed *Bulkeley*. (*g*) Renamed *Eupatoria*.

NOTE.—Originally Nos. 3001–3030 were constructed as 2–2–2 engines, and Nos. 3020–3028 as broad gauge convertible engines. From 1894 all 30 were altered to the 4–2–2 type, Nos. 3020–3028 having previously been adapted to the standard gauge.

Digitized by Google

Mr. Dean's successor, Mr. G. J. Churchward, in order to make them more up to date, rebuilt 31 of these engines with new boilers having Belpaire fireboxes and a higher working pressure, 16 with domeless, and 15 with domed barrels. Again, of those furnished with non-domed barrels, eight were subsequently reconstructed with boilers having a dome in the back ring. The first of the 7-ft. 8-in. singles to be rebuilt was No. 3027 *Worcester*, which was fitted with a domeless parallel boiler, and a Belpaire firebox, in 1900. This engine then had 1,663 sq. ft. of heating surface, a grate area of 21·45 sq. ft., and a steam pressure of 180 lb. per sq. in. Its tractive force was 14,250 lb. The weight of the engine was increased to 51 tons, of which 18 tons 2 cwt. rested on the driving wheels. In 1911 *Worcester* was supplied with a smaller and domed Belpaire boiler. This type of boiler, which was fitted to a number of the other engines, had 1,285·45 sq. ft. of heating surface, and 18·12 sq. ft. of grate area, the fireboxes being shorter than those of the non-domed boilers. The steam pressure was 180 lb. per sq. in. The engines rebuilt with this boiler weighed 49 tons 17 cwt., and had as much as 19 tons 11 cwt. available for adhesion. The cylinders remained at 19 in. by 24 in., but the diameter of the driving wheels was increased to 7 ft. 9 in., and that of the bogie wheels and trailers to 4 ft. 1½ in., and 4 ft. 7½ in., respectively, these dimensions applying also to the domeless-boilered batch. The new boilers of both kinds had flush-topped smokeboxes resting (in most cases) on saddle-plates; the non-domed ones stood with their centres 8 ft. 6 in. above the rails; the domed ones, 7 ft. 10 in. None of the 7-ft. 8-in. singles was ever superheated.

The list in the next column gives particulars of those which were re-boilered with Belpaire fireboxes.

List of 7-ft. 8-in. Singles Re-Boilered with Belpaire Fireboxes.

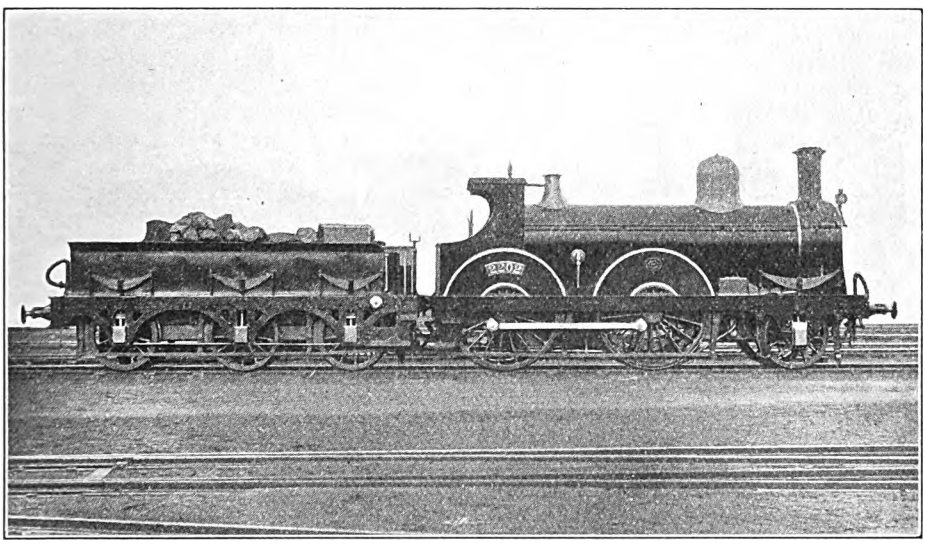
No.	Fitted Domeless Boiler and Belpaire Firebox.	Fitted Domed Boiler and Belpaire Firebox.	Year Cut up.
3004 ..	1903	—	1911
3006 ..	—	1910	1914
3008 ..	—	1911	1912
3009 ..	—	1910	1914
3013 ..	1902	1910	1914
3015 ..	1902	—	1908
3016 ..	1904	—	1911
3018 ..	1904	—	1913
3027 ..	1900	1911	1914
3032 ..	—	1913	1913
3033 ..	1903	—	1911
3039 ..	1902	1913	1915
3043 ..	—	1913	1913
3045 ..	—	1913	1914
3048 ..	1904	1910	1913
3049 ..	1903	1910	1913
3050 ..	1909	—	1915
3052 ..	1904	1913	1913
3055 ..	—	1913	1914
3056 ..	—	1910	1914
3058 ..	1903	—	1912
3060 ..	—	1913	1915
3062 ..	—	1913	1915
3065 ..	—	1911	1914
3066 ..	—	1913	1913
3067 ..	1902	1910	1914
3070 ..	1900	1910	1914
3071 ..	—	1911	1914
3074 ..	—	1913	1915
3079 ..	1900	—	1911
3080 ..	—	1910	1913

Reference has already briefly been made to the record run by No. 3065 *Duke of Connaught*, on May 9, 1904, when the 118½ miles from Bristol to Paddington were covered at an average speed of 71·3 m.p.h. The time from the start to the dead stop was 1 hr. 39 min. 46 sec. Of the total distance, no fewer than 70¼ continuous miles, from Shrivenham to Westbourne Park, were completed in 52 min. 42 sec., equivalent to a mean rate of 80 m.p.h. The maximum speed attained by this single wheeler was 91·8. This performance has been fully dealt with in previous issues of the Railway Magazine; it formed the second portion of the complete run from Plymouth with the American mails, the first part, that from Plymouth to Bristol, 128 miles 10 chains, being the one on which a maximum rate of 102·3 m.p.h. was achieved by the 4-4-0 express engine *City of Truro*, as authentically recorded by the late Mr. Charles Rous-Marten. The gross load hauled by the four-coupled engine was 148 tons, and that hauled by the single-wheeler—from Bristol—was 120 tons. On account of the steeper gradients west of Bristol, *City of Truro's* overall speed for the 128 miles 10 chains was 62, but it ran the 75½ miles from Exeter (passing) to Bristol, at 70·2 m.p.h. The whole performance, as represented by the complete journey from Millbay to Paddington has now a very special interest, in

Digitized by Google

that, according to Mr. Rous-Marten, certain portions of the run were (inferentially) actually booked at 70 m.p.h., a rate that has lately been suggested for our modern express passenger trains as a not impossible daily scheduled achievement. In fact, the time from passing Exeter to Paddington and including the stop at Bristol to change engines, was only 2 hrs. 47 min. 46 sec., which gives a sufficiently near average speed of 70 for the 193½ miles between Exeter and London. This proves the possibility, from the purely mechanical standpoint, of running super-speed expresses, on roads with favourable gradients, and with a clear passage for the trains. On the other hand, taking the time as from North Road, Plymouth, to Paddington, namely 3 hrs. 43 min. 41 sec. for the 245¾ miles (the then distance), the overall average speed is reduced to 66 m.p.h., in consequence of the steeply-graded and sharply-curved sections between Plymouth and Newton Abbot, followed by the long but easier climb from Exeter to Whiteball. On the Bristol to London portion, the gradients are comparatively moderate, and from Swindon the line falls gently for virtually the whole of the 77¼ miles from there to London. On the occasion of the run in question, the road was kept clear throughout, and everything possible was done to make the performance the outstanding success which it undoubtedly was.

With respect to the ordinary work of the 7-ft. 8-in. singles, Mr. Rous-Marten recorded in 1903 a good run from Exeter to Bristol with No. 3027 *Worcester*, as then rebuilt. The 75½ miles between these points were covered in 82 min. 27 sec., and the 20 miles of uphill—the last 2½ miles rising at 1 in 115—to Whiteball summit occupied only 26 min. 3 sec., the minimum speed up the incline being 39·1 m.p.h. Taunton, 30¾ miles from Exeter, was passed in 35 min. 23 sec.; and the 44¾ miles from Taunton to Bristol were completed in 47 min. 4 sec. The load behind the tender was 230 tons. The non-rebuilds have also done excellent work. With a load of six bogie coaches, No. 3005 *Britannia* reached Paddington from Swindon, 77¼ miles, in the net time of 77 min. 15 sec., and in the opposite direction No. 3011 *Greyhound*, hauling eight bogie vehicles, performed the journey in 84 min. 2 sec. On one of the non-stop runs to Exeter by the former route, No. 3001 *Amazon*, with a train weighing 140 tons, covered the 193¾ miles in 8 min. under time. Reading, 36 miles, was passed in 38 min.; Swindon in 83 min. 14 sec. and Bristol 118½ miles in 130 min. Up the

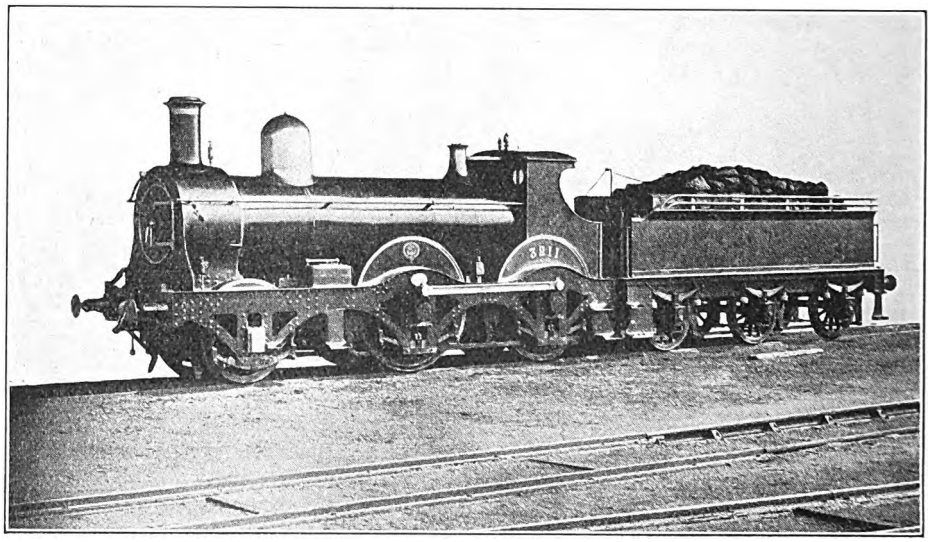


2-4-0 LOCOMOTIVE No. 2202.

Digitized by Google

Wellington bank, partly at 1 in 81, the speed did not fall below 34·6. A good run stands to the credit of No. 3051 *Stormy Petrel* on the London and Birmingham section. To a signal stop at Bordesley, 128¼ miles from Paddington, the time taken was 142 min., giving an average speed of 54·1 m.p.h., but the mean rate to Leamington, 106 miles, was as much as 56. The 18½ miles from Paddington to Slough took 21 min. 59 sec. from the start, and the 63¾ miles to Oxford, 68 min. 17 sec. The minimum speed up the Hatton bank at 1 in 107 was 33 m.p.h. Considering that the load behind the tender was 230 tons, the whole run was a very good one for a single-driver engine.

Predominant as was the single-wheel type on the G.W.R. for so many years, the company employed several classes of four-coupled express tender engines for the South Wales, Severn Tunnel, and Devon and Cornwall lines, and the Northern Division. Down to 1893, these engines were of the 2-4-0 order. Some of them were briefly referred to by Mr. Ahrons, and it only remains for me to mention the later history of the more interesting of of the coupled classes. The 2201-2220 class, built in 1881-82, with inside frames for the coupled wheels, 17-in. by 24-in. cylinders and 6-ft. 8½-in. driving wheels, first claims our attention. The first nine engines of this batch were constructed with open splashers, and with curved outside footplating over the coupled wheels. Of these nine, Nos. 2201-2208 were turned out in 1881, and No. 2209 in 1882. The next lot, Nos. 2210-2220 (also 1882), had straight outside running platforms, and brass-rimmed closed splashers, which, however, had openings at their base for the coupling-rod heads. Originally, all twenty engines had domeless flush-topped boilers. In 1886-87, Nos. 2201-2209 were provided with new boilers having the dome in the front ring, and four engines of the second batch were similarly reboilered: No. 2210 in 1886; No. 2217 in 1892; and Nos. 2212 and 2219 in 1893. The others, I am officially informed, were not altered in the same way, but subsequently some of the boilers were replaced by others in which the dome was on the back course. When fitted with new boilers in 1886-87, Nos. 2201-2209 were rebuilt with closed splashers and straight framing, and they were then like Nos. 2210-2220. None of the "2201's" was superheated, but Nos. 2211 and 2217 were supplied with Belpaire fireboxes in 1911 and 1912, respectively. The boilers without domes had 1,268·5 sq. ft. of heating



2-4-0 LOCOMOTIVE No. 3211.

Digitized by Google

surface and 140 lb. pressure; those with domes, 1,157·38 sq. ft. and 165 lb. The domed engines with ordinary fireboxes weighed 34 tons 6 cwt., and those with Belpaire fireboxes, 35 tons 13 cwt. The tenders of the latter engines were of the newer pattern with solid coal guards in lieu of rails, but had the same water capacity 2,500 gallons, and their loaded weight was the same as that of the old tenders, viz., 34¼ tons. The twenty engines of this class were scrapped in 1904-1921, the last four to be condemned being Nos. 2206, 2213, 2218, and 2220. In 1892-93, however, twenty very similar 2-4-0's were built, and these will be dealt with later.

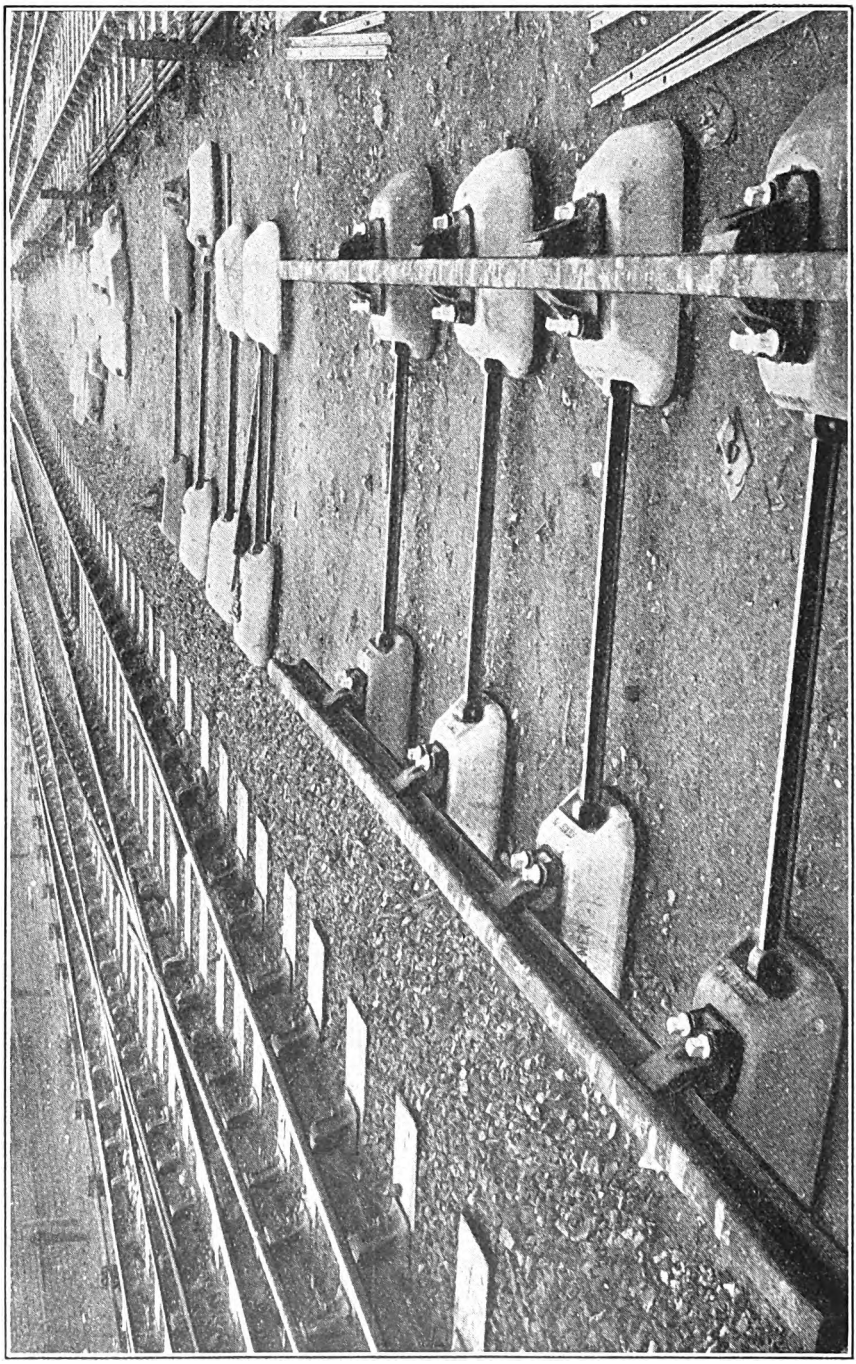
Next to the "2201's" were five 2-4-0 outside-framed mixed traffic engines, Nos. 3201-3205, built in 1884-1885, which had 17-in. by 26-in. cylinders, and driving wheels of the small diameter of 5 ft. 2 in. Three of these engines, Nos. 3201, 3202, and 3204, were still in service at the time of compiling this article. A prominent feature of this class was that the leading wheels, 3 ft. 8 in. in diameter, were directly in line with the smokebox, as in the old 2-4-0's of the G.N.R. The boilers had the dome at the front end; the pressure was 150 lb., the total heating surface 1,209·87 sq. ft., and the grate area 15·2 sq. ft.; weight of engine, 36 tons 2 cwt. In 1909, a beginning was made with the rebuilding of the engines with Belpaire boilers having 180 lb. pressure and 1,197·7 sq. ft. of heating surface; and in 1915 the fitting of six-element Swindon superheaters, consisting of 48 steam tubes, was commenced. The weight of the engines was increased to 37 tons 16 cwt. Weight of improved tender, 34¼ tons. With 180 lb. steam pressure, the tractive force of the engines was 18,545 lb., as against 15,450 lb. with a pressure of 150 lb. Of this class, No. 3205 was condemned in 1919, and No. 3203 in 1925.

Numerically, this class was followed in 1889 by twenty double-framed engines, numbered 3206–3225, the cylinders of which were 18 in. by 24 in., and the driving wheels (with new tyres) 6 ft. 2 in. The frames were of the well-known "Great Western" slotted kind, and all the wheels had underhung springs. As first built, these engines, all but two of which were still at work in the summer of 1926, had 150 lb. pressure, 1,468·82 sq. ft. of heating surface and a grate area of 19 sq. ft. Five of them were fitted with domeless Belpaire parallel boilers, Nos. 3214 and 3225 in 1900; No. 3215 in 1901; No. 3207 in 1905; and No. 3210 in 1908. One, No. 3220, although in service had not been rebuilt with a Belpaire firebox. Fourteen were provided with this form of firebox and with domed barrels, these engines being Nos. 3213, 3217, 3221, 3222, and 3224, which were thus reconstructed in 1901; Nos. 3206 and 3212 in 1902; Nos. 3218 and 3219 in 1904; No. 3211 in 1906; Nos. 3207, 3209, and 3216 in 1907; and No. 3223 in 1914. Of these fourteen, five were afterwards given non-domed boilers of the Belpaire type:—No. 3222 in 1903; No. 3212 in 1905; No. 3217 in 1907; No. 3211 in 1908; and No. 3206 in 1909. Two engines of this class, Nos. 3208 and 3224 were broken up in the earlier part of 1926. The domed Belpaire boilers had 180 lb. pressure, a grate area of 17·2 sq. ft., and a total heating surface of 1,282·74 sq. ft.

Superheating was first applied to an engine of this series in 1916. The superheater was of the six-element size, with 48 steam tubes; the total heating surface, however, remained practically the same as that of the non-superheater Belpaire boilers last mentioned. Originally, the engines weighed 44½ tons, and after being rebuilt the weight was increased by from 1½ to 2 tons. The springs of the leading wheels, previously underhung, were then placed above the frames. The tenders (3,000 gallons), weighed 36¾ tons.

(*To be continued.*)

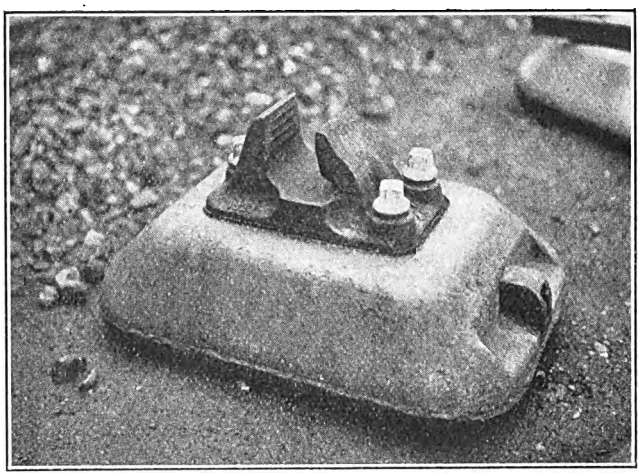
Digitized by Google



REINFORCED CONCRETE SLEEPERS WITH TIE-BARS IN POSITION.

Digitized by Google

Reinforced Concrete Sleepers on the L.N.E.R.



CONCRETE STEEL SLEEPER WITH CHAIR ATTACHED.

MORE than a million and a quarter sleepers are used annually by the London and North Eastern Railway alone, and the provision of these from a suitable class of timber, their seasoning and their preservation by complete impregnation under pressure with creosote, is one of the most important items of permanent-way maintenance.

For the present there does not appear to be any economic necessity to substitute any other material for this work, but the experience of the war and a possible future shortage of such timber makes it advisable that every likely substitute should be carefully considered and experimented with by railway engineers.

The most promising substitutes so far tried out are steel and concrete, but up to the present it can hardly be said that either of these materials have been utilised in designs which have proved perfectly satisfactory in this country.

One of the main factors which renders the success or failure of such permanent-way accessories in other countries no reliable or unfailing guide to their success or failure in this country is our climate. Steel sleepers, for instance, have been a proved success in the drier atmosphere of South Africa, but premature corrosion is a serious factor in the life of sleepers of this material in Great Britain.

The introduction of reinforced concrete provides a most hopeful substitute for timber, and many designs have both been made and tried by the various railway companies. These have been principally of two types, a continuous block practically embodying the shape of the timber sleeper, and separate concrete blocks under each rail connected by steel rod ties to preserve the correct gauge, a combination of concrete and steel.

With regard to the former type, long-period tests have shown these to have mainly failed, either from cracking, crushing, abrasion, or disintegration.

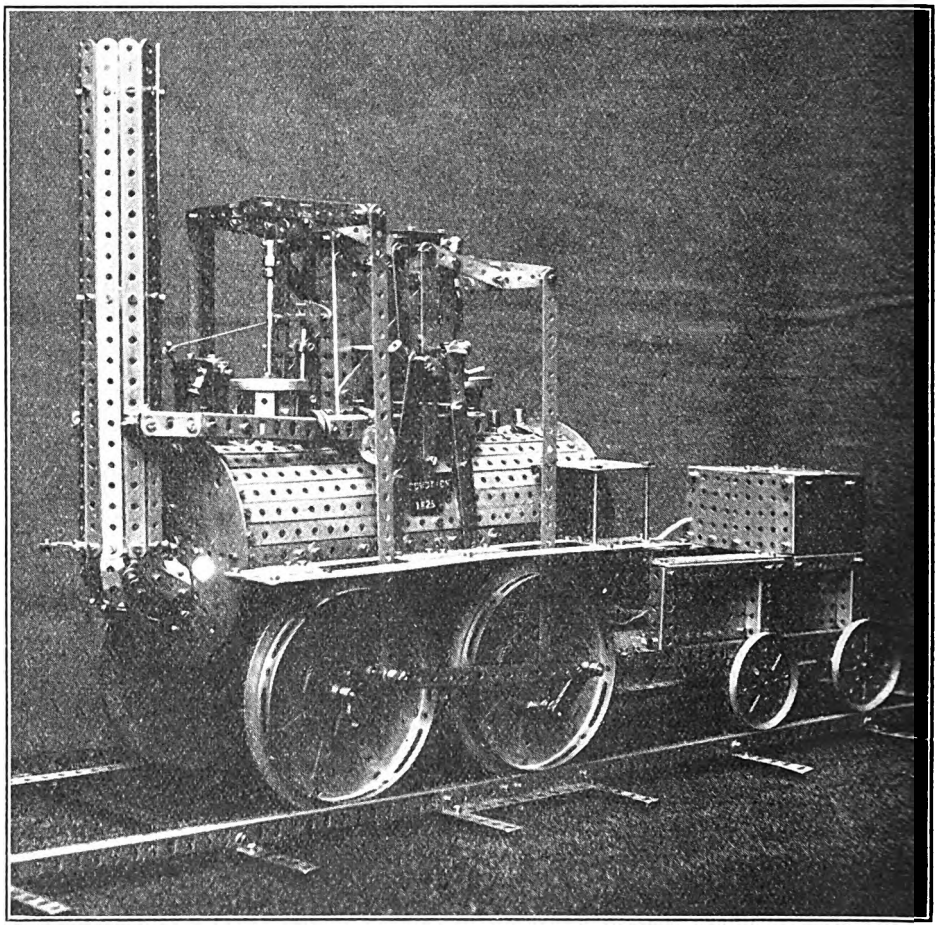
The second type, concrete-steel, are being experimented with by the London and North Eastern Railway, who have arranged for 1,000 to be used under heavy main-line traffic conditions at Manor Park, near London. These sleepers are the patent design of Mr. D. H. Stent, a former Indian railway engineer. This type has been in successful use on an Indian railway for some years, but the experimental sleepers which the L.N.E.R. have introduced are amended to suit the requirements of English practice.

A special cast-iron chair has also been designed for use in connection with these experiments, being on the new standard lines with screw and ferrule fastenings suitable for the reinforced-concrete block, which is itself tilted inwards to the angle of 1 in 20. Timber sleepers have been retained at the rail joints, and two ordinary sleepers inserted in each rail length.

The deciding factor in determining the adoption of all permanent-way materials, apart from their suitability, is, of course, the relation of first cost to length of life, so that some years of use must elapse before the results of experiments made can be ascertained.

Digitized by Google

"MECCANO" MODEL OF "LOCOMOTION."



MR. RICHARD S. MILLER, of Newark-on-Trent, sends two photographs, one of which is reproduced, showing a cleverly-made model in "Meccano" of the old Stockton and Darlington engine *Locomotion*.

The photograph is self-explanatory, so far as the method of building up is concerned. The following notes may, however, be added: A reversible motor is fixed inside the boiler and an accumulator is placed inside the water tank on the tender. The motion is reduced so that the driving wheels revolve at about 40 r.p.m. Such details as bell, safety-valve, manhole, boiler-pump and slip eccentric for working the valves, &c., are fitted on.

Digitized by Google

A Novel Train Despatching System.

ALTHOUGH thousands of miles of railway in the United States and Canada are now equipped with modern signalling, largely of an automatic or semi-automatic character, there are still many sections which are controlled by the well-known train-despatching system, trains being operated by train orders issued through the train despatcher. In view of this fact, a system has been developed by the General Railway Signal Company, of Rochester, N.Y., U.S.A., under the direction of Mr. Sedgwick N. Wight, Commercial Engineer to the company, in conjunction with Mr. B. J. Schwendt, Assistant Signal Engineer for the New York Central Western and Ohio Central lines, and applied to a section of 40 miles between Toledo, Ohio and Berwick on the Toledo and Ohio Central lines. This installation provides for the operation of essential points and signals within the area covered, as well as the direction of train movements by the despatcher. In other words, the train despatcher governs the actual movements of all trains within his area, himself operating essential signals and points as required, instead of issuing instructions for the movements of each train, leaving it to the train and local staffs to carry out the details, with possible risk of misunderstanding, unsafe action, &c.

The despatching machine comprises a series of control levers, each having three positions. Each of these levers provides entire control of one end of a station or other essential traffic position and covers not only the setting of points according to the movement desired, but also the exhibition of correct signals. There is, of course, very complete interlocking between opposing signals to ensure that point positions and signal indications agree, and generally to avoid any possibility of contradictory movements being made. There are also "train reporting" arrangements operated by the track circuits on each standard track at essential points, while the arrangement is such that, if any siding points are opened by means of levers on the spot, connections are broken, so that no through movement can be permitted.

The control levers in the despatching system have three positions: central, upward and downward. The central is the normal position, and all signals concerned are then placed at danger, although points remain in whatever position they have previously assumed. When moved upwardly, the points are moved to the diverging route, if not already in that position, while the signals give proceed or caution indications, this being further governed by the presence of other trains in the section, according to the ordinary principles of automatic and power signalling. When the control lever is moved downwardly, the points are set for the main track route and the signals correspondingly set.

Above the frame there is a track diagram with sockets, in which plugs representing trains can be placed, these being moved by the despatcher as he receives advice of the progress of each train by means of light indicators. These, known as "O S" indicators, are operated by track circuits adjacent to each set of points, and, after the train has passed, the "train reporting" point remains illuminated until the train has passed the next "O S" point, thus clearing the track section in question. This indicator also gives brief flashes as the points open and close, thus providing an indication that the points have correctly responded. A single-stroke bell sounds whenever an "O S" indicator lights up, to direct attention to the fact that a train has passed over a reporting point. In addition, there is mounted above the despatching machine an automatic recording diagram, which records the movements of every train, at the same time providing a means of reference to assist the operator.

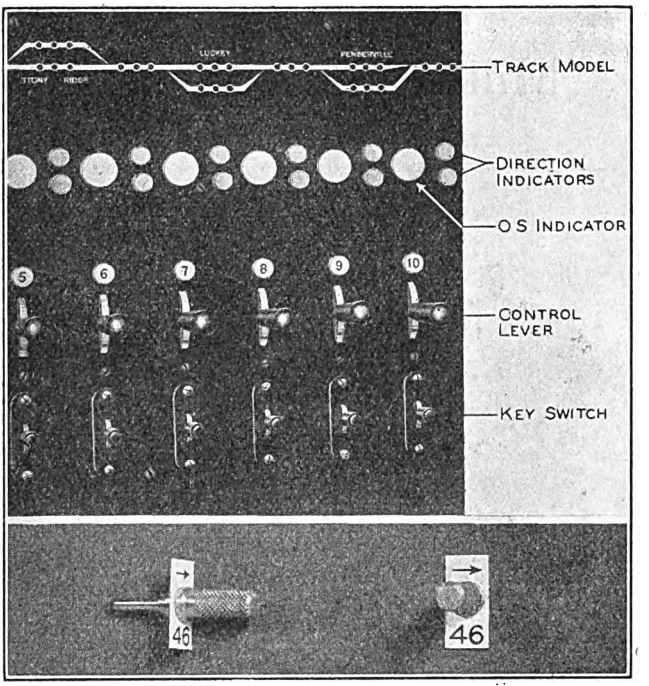
It will be remembered that the general system of operation is that known as "absolute permissive block," according to which it is permitted to send two or more trains in the same direction, even although the first may not have cleared the section, but opposite direction movements are, of course, absolutely prohibited between passing loops. In the case of trains following one another, adequate

Digitized by Google

Digitized by Google

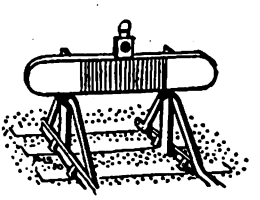
protection is afforded by the signals, which, so far as the despatcher is concerned, operate automatically, and thus protect a train from one following by the exhibition of stop or caution signals independently of the train despatcher. All signals are of colour-light type using standard aspects, two or three-position, as necessary.

It is estimated that this installation has enabled the train capacity of the section to be so far increased that for some time to come there will be no need to consider the cost of double tracking as a necessity. It is, in fact, considered that the traffic can be handled at a lower annual cost than would be the case if the whole of the section were double track. The installation has been in use since July 25 last, and so far, we understand, the result has been not only that trains have been worked in a manner which was rarely possible under previous conditions, but that no difficulties have arisen beyond those which are provided for in the design of the installation.



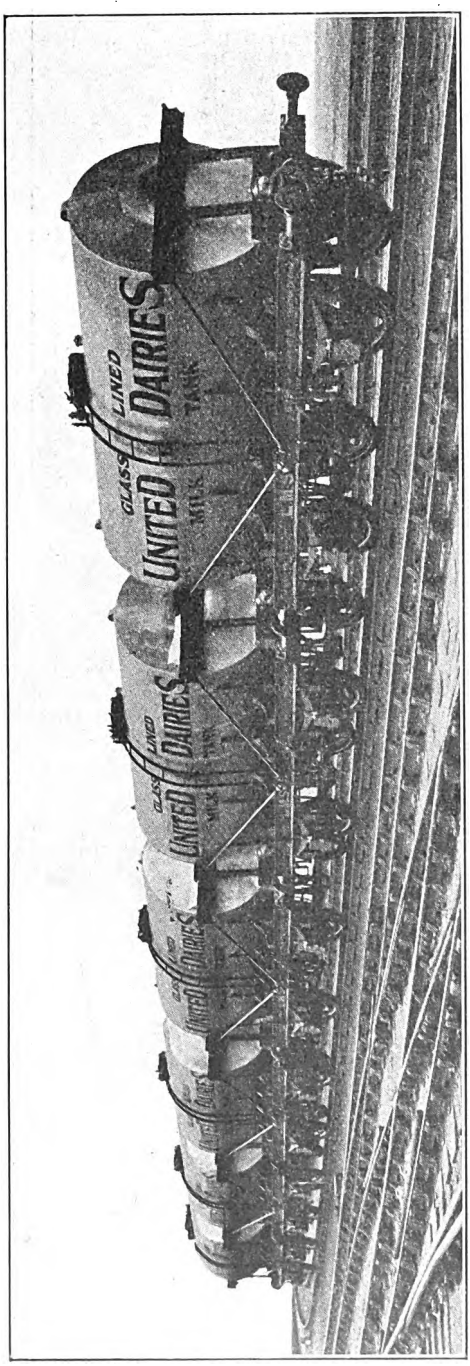
(ABOVE) SECTION OF CONTROL PANEL ON DESPATCHING MACHINE; (BELOW) TRAIN TOKEN FOR TRACK DIAGRAM.

The train-despatching system is not usual in this country, though traffic control has proved itself to be an immense advantage in the handling of traffic. There are, however, many parts of the world where methods generally similar, or having features in common with the despatching system, are in operation, and we anticipate that officers responsible for the working of traffic under such conditions will find the New York Central installation worthy of the most careful study and examination. There are, indeed, certain sections of railway in this country where the possibilities of such a system are deserving of consideration, even although it would involve a radical departure from the methods usual on British lines.



Digitized by Google

Milk Transport in Tank Wagons.



TANK WAGONS FOR MILK TRANSIT, CONSTRUCTED BY THE L.M.S.R.

WHILE it is not altogether new to convey milk by rail in bulk, using wagons of suitably-designed tank type, in that it has been done to some extent in the United States and elsewhere, the fact that a number of special problems are involved has hitherto prevented the practice being adopted as a regular one in this country. There is, however, much to be said for the method, particularly when it is adopted in conjunction with retail distribution by sealed bottles, in that it enables handling or any contact with possible contaminating influences to be avoided from the initial point of bulk collection to the final point of delivery to the individual retail customer. It thus becomes possible to do away entirely with the cumbersome method hitherto usual, of conveying the milk in large numbers of comparatively small churns, each of which has to be handled several times in the course of a journey (also in course of return, empty), and each of which has to be emptied individually, often under conditions which introduce risks of contamination in several ways. Incidentally, it enables the costs of transport and of the inevitable multiple handling involved to be materially reduced, an important consideration, seeing that rail charges for milk conveyance are already very low though the traffic is given the benefit of fast transit.

On the great railways of this country alone, some 280,000,000 gallons of milk are conveyed annually. This means, in the aggregate, an annual movement of many millions of churns, in each case with loading, unloading and intermediate handling in both the full and empty directions. The operations involved, moreover, require the services of loaders and unloaders at the points of origin, at collecting centres, at the loading stations, at transfer points, at the rail delivery point, and at the centres for retail distribution, apart from other incidental operations and handling which may be entailed. Hence it follows that the conveyance of milk in bulk from the collecting centres to the distribution centres is altogether advantageous, in

Digitized by Google

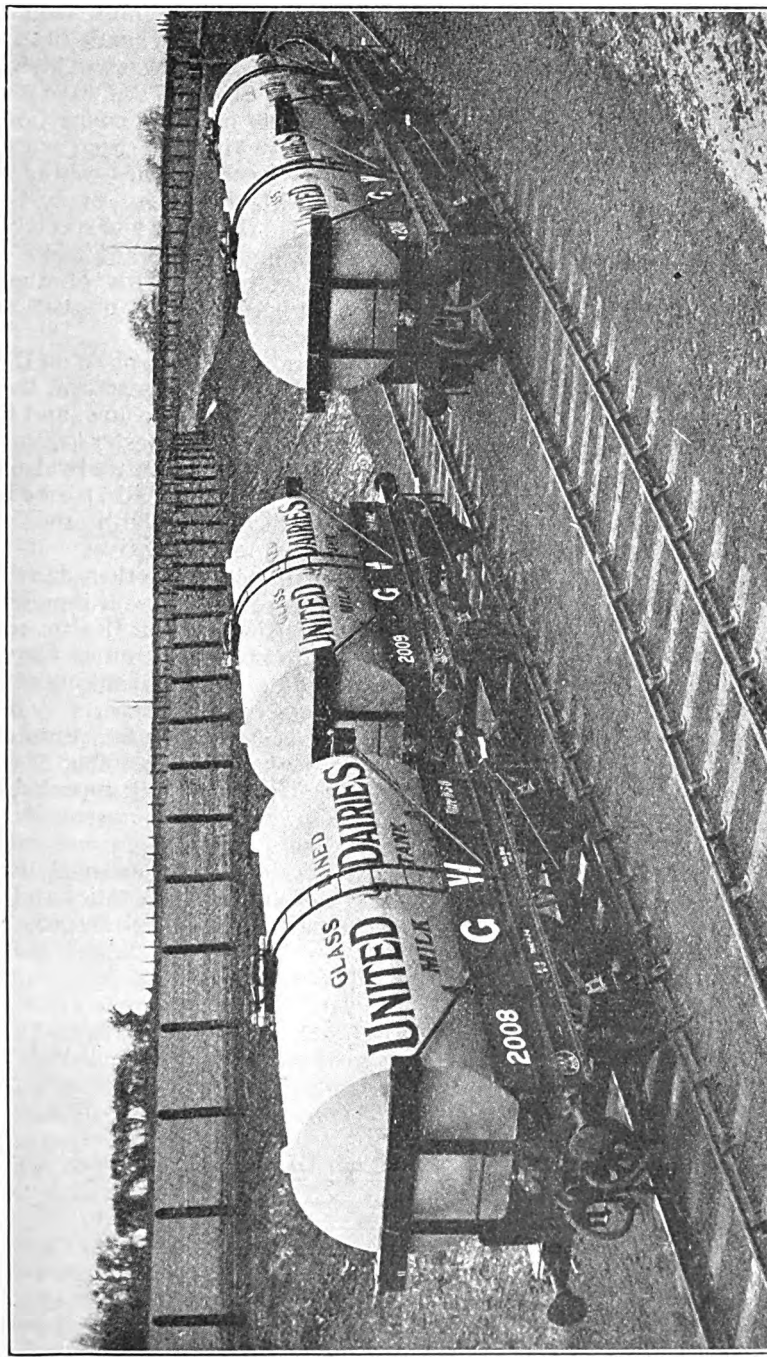


Photo.] TANK WAGONS FOR MILK TRANSIT, CONSTRUCTED BY THE G.W.R. [*Topical.*

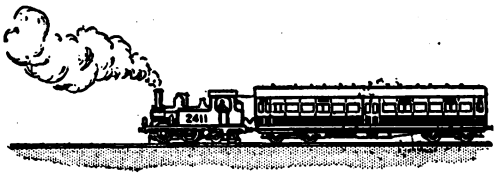
Digitized by Google

that it simplifies transport very considerably, as well as allowing it to be very much expedited, it reduces handling to a minimum, and permits of hygienic conditions being maintained throughout transit. The last-mentioned point is one of great importance, in that most of the great dairy organisations already provide for hygienic methods in collection and in distribution, so that hygienic transport completes the "hygienic chain." Indeed, where milk is delivered in sealed bottles and sterilised, it can be said that tank wagon transit enables milk to travel, if not from the milking point, at least from the country collecting depot, direct to the individual retail purchaser free from any risk of contamination and under hygienic conditions throughout.

For conveying milk in bulk it has been necessary to design special wagons. The containers, each of which will hold 3,000 gallons (equal to about 300 churns), are lined with glass enamel, fused to the steel bodies, and special provision is made for adequate cleaning and sterilisation before being filled. They are also insulated to maintain an equable temperature, and on arrival at the town centre the milk is transferred directly, without ever being exposed to the air, to the sterilising and bottle-filling and sealing plants. There are also several other considerations which have been taken into account in designing the wagons and in the equipment of the plant at each of the country collecting depots and at the distributing centre in London.

This development is the result of joint action between the United Dairies Limited, one of the great milk-distributing organisations by which the milk requirements of London are met, and the railway companies, the Great Western and London Midland and Scottish Railways playing a leading part in this connection. The vehicles have, in fact, been constructed in the railway companies' works, in conjunction with the Dairy Supply Co. Ltd., who supplied the tanks and special fittings, while the organisation of train services to suit the requirements of the traffic has been a matter of mutual arrangement.

Inaugural trips took place on December 1 from Wootton Bassett, on the Great Western Railway main line, and Calveley (Cheshire), on the Chester-Crewe section of the L.M.S.R., to the Mitre Bridge (Willesden) depot of the United Dairies Limited. Besides officers of both the railways concerned, representatives of United Dairies Limited and other dairy organisations, there were present representatives from the Ministries of Health and Agriculture, from various other Government Departments, municipal officers and others, including recognised experts in regard to hygiene, bacteriology, &c., thus affording evidence that the desirable features of milk conveyance in bulk appealed strongly to those who have responsibilities in regard to public health and well-being, as well as to those concerned in the rail transit of national necessities and engaged in the particular trades affected.



Digitized by Google

British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

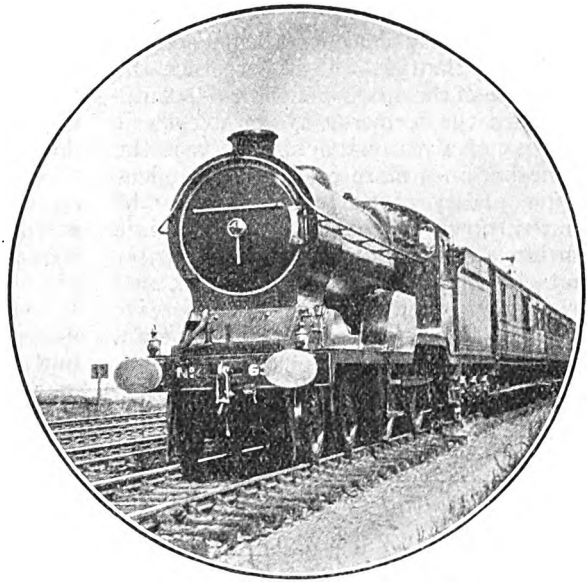


Photo.] [*C. J. L. Romanes.*

EDINBURGH-GLASGOW EXPRESS NEAR SAUGHTON, L.N.E.R.

4-4-0 No. 6380 *Evan Dhu.*

FROM a long-standing correspondent, whose acquaintance with the technical aspects of locomotive running I well know to be extensive, I have received a most interesting letter, bearing on the subject matter of my last December's article. "I have read with very great interest," he writes, "the description of your footplate experience on the new Great Western 'King' class locomotive *King George II*. While not wishing in any way to detract from the excellence of the run, on so tight a schedule, certain conditions do stand out which go further to strengthen the view I have always held, that the Gresley 'Pacific' is in reality the most powerful express locomotive in the country, and also the ideal express type.

"There is no doubt that *King George II* was being driven as the engine was designed to be driven—with a very early cut-off—and that that is the advantage of a high working pressure and a long piston stroke; moreover, with a boiler of this size and so large a cylinder volume, any other driving method would soon land the driver in difficulties. But the fact cannot escape notice that the fireman had trouble with his fire, resulting in a reduction of the working pressure to 200 lb., at a critical point when the engine was faced with some of the hardest work of the journey. Both Rowse and Osborne are experts; the former does not waste steam, and the latter, by his skill, was able to extricate the engine from an awkward position. But I venture to think that, in the hands of a less expert crew, the trip might not have made very entertaining reading. In other words, the boiler was being drawn on up to its maximum capacity. This brings up the question of the value of the tractive effort calculation—a very misleading figure which presupposes the ability of the boiler to supply sufficient steam to make it constantly effective. Do you suppose for one moment that the wonderful runs which you have recorded from time to time behind the large-boilered Ivatt 'Atlantics' of the L.N.E.R., could have been accomplished by the small-boilered variety? Yet the tractive effort figure of these two classes is identical!

"Turning to your article again, I find you lay stress on the fact that the coal was of poor quality. Such coal would have been quite satisfactory to a Gresley 'Pacific'; indeed, it is generally the practice on the L.N.E.R. to reserve the

Digitized by Google

small and dusty coal for the 'Pacifics' and the 'Atlantics.' It is here that the advantage of the 4-6-2 over the 4-6-0 comes in. With the former it is possible to fit a firebox of a reasonable size, so that the engine becomes more or less independent of the quality of the coal. It may be granted, however, that the 'Pacific' is a difficult engine to design, within the narrow limits of the British loading gauge, and Mr. Gresley is the only British locomotive engineer who has produced a successful locomotive of this wheel arrangement. The weakness of both the other British 4-6-2 designs was that they were in the nature of enlargements of existing types, rather than new designs. A Great Western 'Pacific,' designed to make use of every advantage offered by the 4-6-2 wheel arrangement, would entail a complete departure from Great Western standards, and it is probably for this reason that the type has not found favour at Swindon. Moreover, the Great Western are in a favourable position for obtaining supplies of the best Welsh steam coal for locomotive purposes, so that the need for larger fireboxes has not yet been pressed. But it is difficult to see why the L.M.S. Company has been so shy of the 'Pacific' type.

"In order to obtain a direct comparison of performance, as between a Gresley 'Pacific' and an engine of the 'King' type, I have looked up the log of the running of *Victor Wild* of the L.N.E.R. during the exchange of 1925. I find that the tare load was slightly heavier throughout, in the case of the 'Pacific,' and that comparison is only possible as far as Exeter, in view of the recent tightening up of the schedule beyond that point. It may be admitted that *King George II* made slightly the better times throughout, but it was often only a matter of seconds, and the 'King' was never much more than a minute ahead of the 'Pacific.' It is really extraordinary how very nearly the times approximate. As regards the engines, the tractive effort of the 'Pacific' was less than three-quarters of that of the 4-6-0, while Driver Pibworth, on the L.N.E.R. engine, was a stranger to the road, and was, in addition, unable to take full advantage of easy stretches for bursts of high speed. There is no doubt that the 'Kings' of the G.W.R. are very successful machines, admirably suited to G.W. requirements, but, like highly-bred animals, they require careful attention and a good diet, to make their exceptional tractive effort effective in practice. Further, it does look as if the limits of power possible

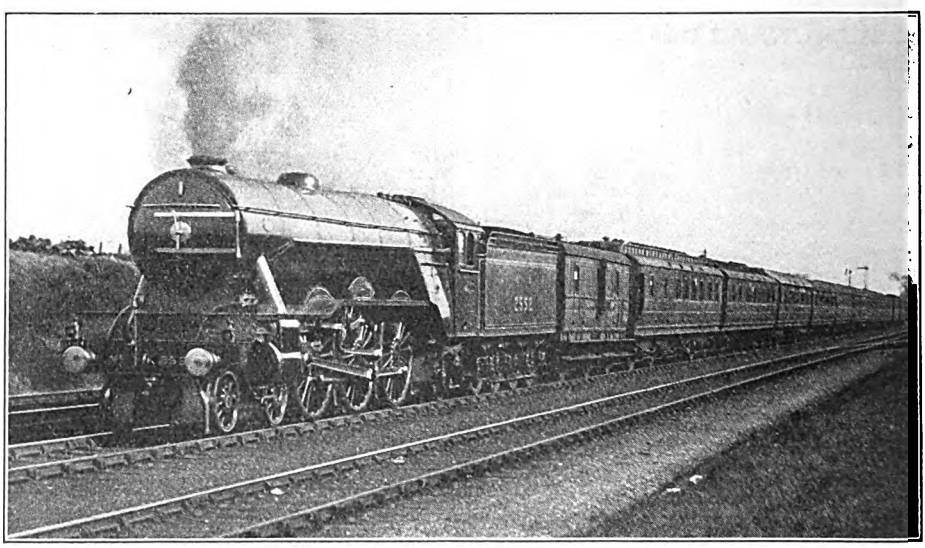


Photo.] [*C. Stevens.*

KING'S CROSS-SHERINGHAM AND CROMER EXPRESS, L.N.E.R.

4-6-2 locomotive No. 2552 *Sansovino.*

Digitized by Google

within the confines of the 4-6-0 wheel arrangement have been reached, and that the load imposed on the engine on your run was about the maximum that can be handled day in and day out, with consistent time-keeping, by these engines."

So many issues are raised in this letter that it is difficult to know how, in the necessarily brief compass of the reply, to deal with them all adequately. The main plank in my correspondent's platform is the fact that, at a certain stage in the journey to Plymouth, the working pressure of *King George II* fell from the normal figure of 250 lb. to 200 lb. It will doubtless surprise him to hear that in certain recent trips which it has been my good fortune to make on the rebuilt L.N.E.R. super-"Pacific" No. 4480, *Enterprise*, carrying a working pressure of 220 lb. per sq. in., the pressure on one journey, with coal which had the appearance, at least, of being superior in quality to that just referred to, fell to round about 170 lb. This drop of 50 lb. was exactly equal to that observed on the G.W.R. engine. The train was the 10.10 a.m. from King's Cross to Leeds, and just as, in similar circumstances, *King George II* lost 70 sec. between Taunton and Exeter, but thereby regained the pressure and subsequently the lost time as well, so on *Enterprise* we lost 1¾ min. from Hatfield to Hitchin, but were on time at Peterborough, and with pressure practically restored. I am prepared to agree, however, that in the case of *Enterprise* there appeared to be but little interference with the normal course of firing to put matters right; no use of the pricker, for example, was required. "She's not steaming well this morning," was the driver's terse comment; and the loss of pressure by *Enterprise* certainly did appear to be one of those inexplicable locomotive "indispositions" which not infrequently affect running, and—compounded, probably, of several minor causes acting in conjunction—defy ready explanation. But I mention this to show that it is possible for a "Pacific" to suffer from precisely the same ailment as the "King," against which the firegrate of large dimensions is no guarantee of immunity.

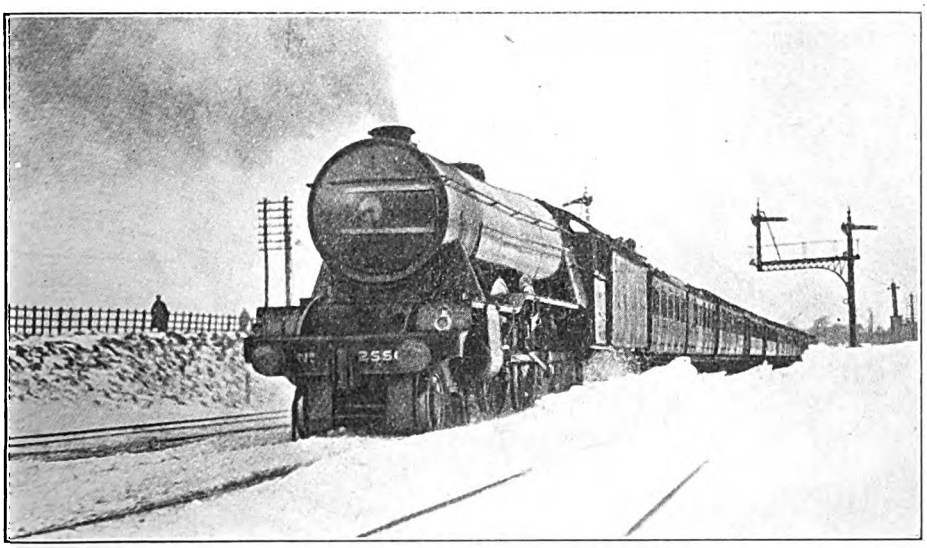


Photo.] [*F. R. Hebron.*

HULL-LONDON EXPRESS IN SNOWDRIFTS NEAR POTTER'S BAR, DECEMBER 27, 1927.

4-6-2 locomotive No. 2556 *Ormonde*.

With this reservation, I am not sure that the main contention of my correspondent's letter is not correct. On a schedule of first-class difficulty, I fancy that a crew whose experience was not of "top link" character might have a better chance of timekeeping with a "Pacific" of the L.N.E.R. than with a

Digitized by Google

Great Western "King." Too much must not be deduced, in this connection, from cut-off positions. It does not follow, because a locomotive is worked habitually in cut-offs of, say, 15 per cent., that the remaining 60 per cent. of cut-off, assuming a maximum of 75 per cent., is "in reserve." It would be absurd to suppose that an engine whose boiler produces sufficient steam for the maintenance of 70 miles an hour on the level with a train of 450 tons, working on full regulator and 15 per cent. cut-off, could work at a corresponding speed with full regulator and, say, 50 per cent. cut-off, or 40, or perhaps even 30 per cent. The point of the long-stroke cylinder, the early cut-off and the full regulator opening is that the maximum amount of effective work, by way of expansion, is being got out of the minimum volume of steam—that is to say, that the efficiency of the engine is being increased.

A correspondent recently asked me to explain the meaning of "cut-off," to which such frequent references are made in these articles, and I pause for a moment to do so, as this affords me the opportunity, at the same time, of reasoning out the principle which has been just enunciated. The valve-motion of a locomotive is designed to admit live steam from the boiler to the cylinders for a certain proportion of the forward stroke of the pistons; beyond that point the supply of steam is cut off, by reason of the slide valve or piston valve closing the inlet port, and for the remainder of the stroke the steam does its work in the cylinder by expansion. The exact moment at which the admission of steam ceases is known as the "cut-off," and is expressed as a percentage of the travel of the piston through the cylinder. If the engine is "cutting off at 15 per cent.," for example, steam is being admitted for 15 per cent. of the travel of the piston, and from then until the opening of the port to exhaust it is expanding. The shorter the cut-off, so much the less the volume of steam admitted to the cylinder, and so much the greater the ratio of its expansion.

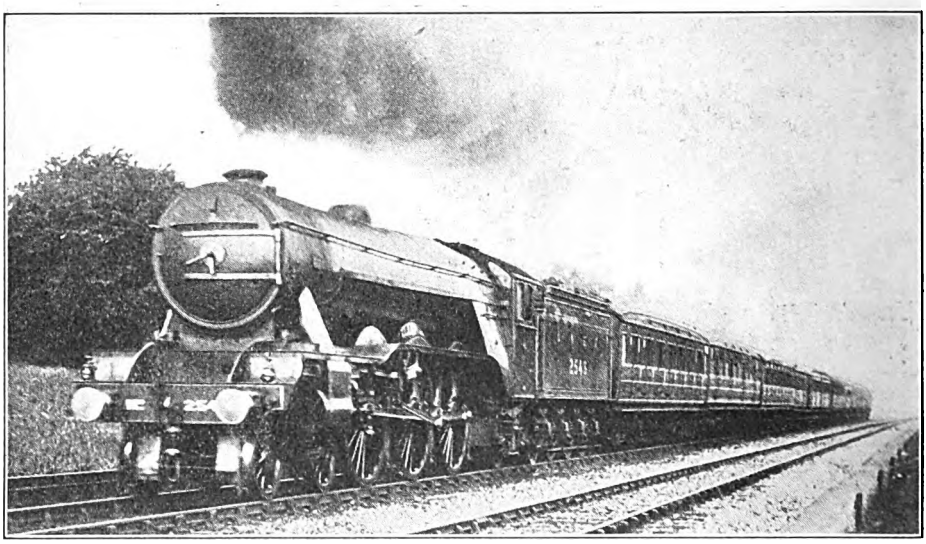


Photo.] **UP L.N.E.R. EXPRESS NEAR GRANTHAM.** [*W. Leslie Good.*

4-6-2 locomotive No. 2543 *Melton*.

The higher the working steam pressure of the engine, by so much the more is the steam rendered capable of expansion. But in many locomotive types, the valve-setting has not permitted of working habitually in short cut-offs. By reason of short valve-travels, bringing the cut-off back has resulted in an unduly early closing of the exhaust ports, with the result that steam in no negligible volume has been imprisoned in the cylinders; this, in its

Digitized by Google

turn, has imposed excessive strains on motion parts, and has tended, in particular, to cause heating of the connecting rod big-ends. In days gone by, the chief objection to lengthening valve-travels, with a view to overcoming this back-pressure difficulty, has been the friction of the slide-valve on port-faces, which has increased proportionately to the speed at which the valve moves, governed, in its turn, by the length of its travel. But this difficulty practically disappeared with the substitution of the piston-valve for the slide-valve, and in the circumstances it is surprising that the use of long valve-travels, coupled with high working pressures, has not become more general since first the Great Western Railway set the fashion with the 4-6-0 engine *William Dean* (now No. 2900) in 1902.

Short valve-travels, and the relatively long cut-offs that they demand, are open to another objection. It is that at speed the engine regulator must be closed to the one-half position, and less, in order that too much steam shall not pass down to the cylinders; otherwise the blast of the engine would become so fierce, probably, as to pull a large proportion of the fire, in but a partially consumed condition, through the tubes and out of the chimney. This partial closing of the regulator throttles the steam, and has the effect of lowering the steam pressure in no small degree before the steam reaches the cylinders. It is on account of losses such as these that, in the tractive effort formula, it is customary to allow only 85 per cent. of the working steam pressure as the "mean effective pressure" in the cylinders; but with excessive throttling the mean effective pressure is likely to be considerably less than 85 per cent. of the working pressure.

So it is that the engine with a short valve-travel is likely to lose doubly in efficiency—both by throttling of the steam and by inadequate expansion in the cylinders. Alternatively, it is sometimes the practice, with an engine of this type, to use a wider regulator opening and a fairly long cut-off, and so violently to sharpen the blast of the engine as to hasten the rate of combustion of the fuel on the firegrate, and thus to increase the rate at which steam is produced in the boiler; but the chief evils of "thrashing" of this character are the loss of efficiency arising out of fuel only partially consumed, and the objectionable strains put upon the motion of the engine, leading to excessive costs of maintenance. The most striking

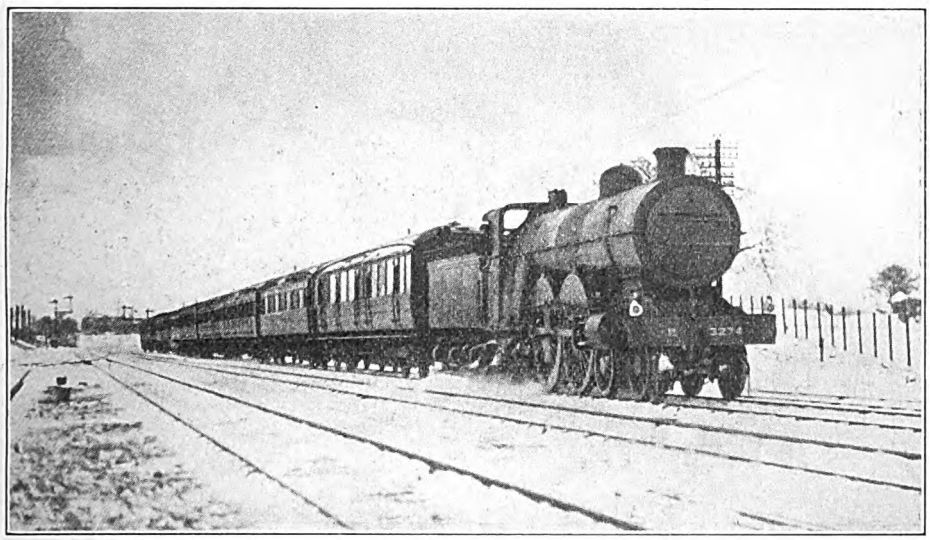


Photo.] [*F. R. Hebron.*

UP NEWCASTLE EXPRESS NEAR POTTER'S BAR.

4-4-2 locomotive No. 3274.

Digitized by Google

example that one can call to mind of this method of locomotive working is the astonishing feats performed in earlier days by locomotives of such limited dimensions as the "George the Fifth" 4-4-0 engines on the L. & N.W.R.

But it is clear to-day that every British locomotive engineer is keenly alive to the need for greater efficiency in locomotive working, and each of the latest express locomotive designs of the "Big Four" fully bears witness to the attention that is being devoted to this matter, by way of increased working pressures, lengthened valve-travels, and, as an almost inevitable result, increased blast orifices and softened exhaust. It is on record that four successive enlargements have been made of the blast orifice of the Southern 4-6-0 *Lord Nelson,* without any impairing of the steam-raising capacity of the engine, and, of course, a reduction—in some degree commensurate—of coal consumption. One of the most remarkable impressions that I derived from my footplate journeys on *Enterprise* of the L.N.E.R. has been the absolute noiselessness of the exhaust, and the way in which the vertical column of exhausted steam from the chimney, so characteristic of these engines, has now given place to a gently-drifting cloud, which at times grew quite troublesome from the look-out point of view, and needed to be "lifted" temporarily, by means of the blower, to secure clear observation of the signals. This was the fruit of a 15 per cent. cut-off—now the normal working position on this engine—and the result has been to lower the average coal consumption, on normal duties of all descriptions, from round about 55 to under 40 lb. per mile, representing a really wonderful increase in thermal efficiency.

But it was noticeable that Driver Tomblin never opened out the regulator of *Enterprise* to the full. "We don't want to arrive the day before we're due," he remarked laconically to me. There is no doubt that on the 10.10 a.m. journey to which I have already referred, a full regulator opening would rapidly have restored the pressure, but it would at the same time have resulted in an extravagant gain on schedule. The point is that the engine, on 15 per cent., and occasionally only 14 per cent. cut-off, was doing all that was required of her, and while it has been proved possible to work her at as little as 10 per cent. cut-off—which probably would have permitted a full regulator opening—the driver regards it as not altogether wise,

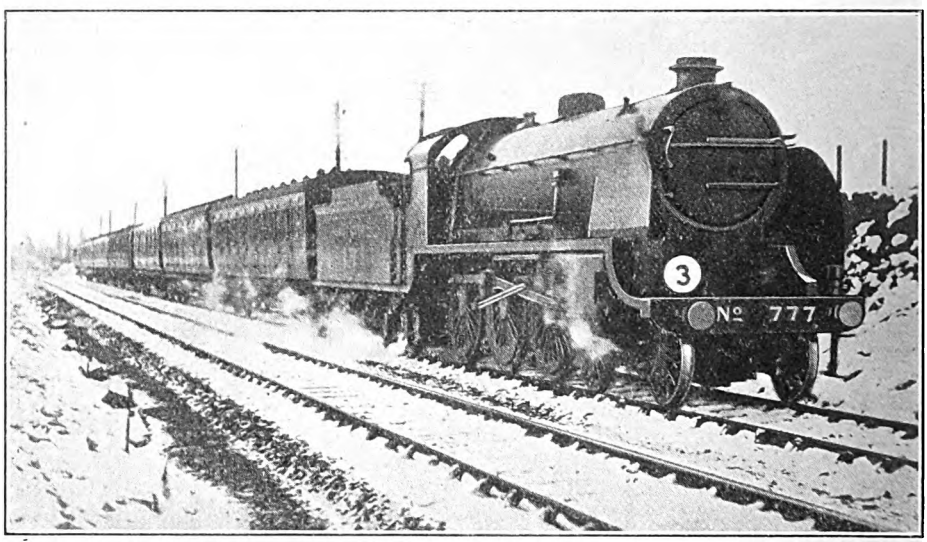


Photo.] [*C. E. Hawksworth.*

"ATLANTIC COAST EXPRESS," SOUTHERN RAILWAY, PASSING REDBRIDGE, NEAR SOUTHAMPTON.

Diverted during Christmas snowstorms.

Digitized by Google

in view of possible strain on the motion parts, to work below 15 per cent. A number of the ordinary "Pacifics," (of which No. 2555, *Centenary*, was the first) have now had their valve-travel altered to correspond with that of *Enterprise*, and with similar happy results in the matter of reduced coal consumption, as they can be and are worked in short cut-offs, with full regulator, but considerably greater demands will need to be made by the time table on the 220-lb. super-"Pacifics" before such working, without extravagantly short cut-offs, becomes practicable. It is even possible, indeed, that the cylinders of the latter may be lined up somewhat from their present diameter of 20 in., in order to get over the difficulty, and allow of full regulator working. From facts such as these I consider there is reason in my correspondent's contention that when it comes to maximum effort in other than the most expert hands, the Gresley super-"Pacific" design has probably more in the way of reserve even than the Great Western "King."

As regards the remaining points in my correspondent's letter, I fear that the test week of the 1925 exchange offers but a slender basis of comparison. If the L.N.E.R. "Pacific" did maintain time with the down "Limited" to Plymouth, and so almost equalled the times of my recent trip—as far as Exeter, at least—it is beyond question that Driver Young, on *Pendennis Castle*, made better times between King's Cross and Doncaster than the "Pacific" with which he ran in competition, so that nothing can be gained from the former deduction. One might write at great length on this point, but present considerations of space do not permit. The more experience that I have of footplate running, again, the more valueless do comparisons appear to me which are based merely upon times, without reference to other vital factors in locomotive working.

Further, though it is probable that *The Great Bear* of the G.W.R. did not, in her performance, altogether meet the expectations of her designer, especially in comparison with the remarkable work of his 4-6-0 designs, I imagine that the most damaging objection to the engine was the limitation of the routes over which she was permitted to run. The constant reverse curvature of the West of England main line, from Reading onwards, is in my opinion such as to militate permanently against the adoption of the 4-6-2 wheel arrangement for general express service on Great Western metals; its effect on the running of the L.N.E.R. engine *Victor Wild* in the 1925 exchange, resulting in drastic limitation of downhill

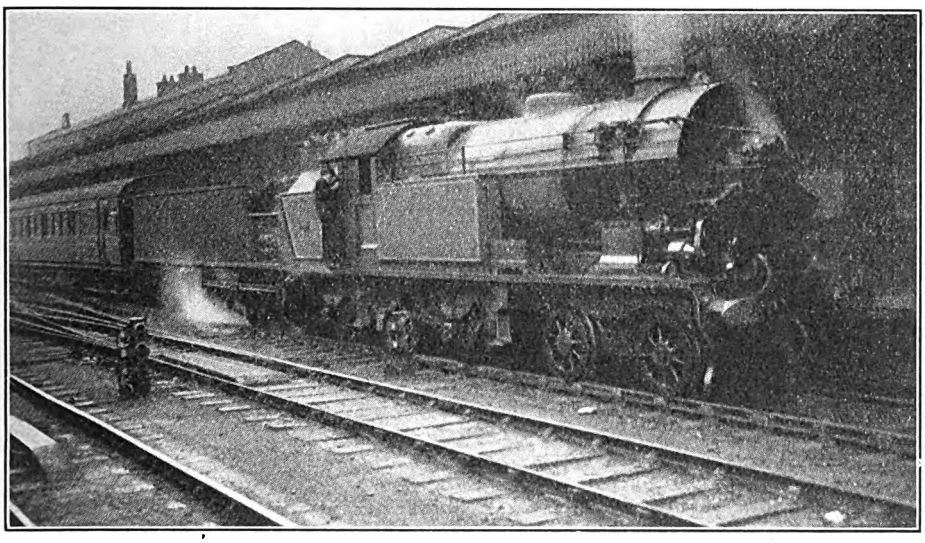


Photo.] [*J. N. Hall.*

LJUNGSTRÖM TURBINE LOCOMOTIVE ON 8.55 A.M. MANCHESTER-LONDON EXPRESS AT NOTTINGHAM (L.M.S.) STATION.

Digitized by Google

speeds, has already been mentioned. If any further express locomotive development is required on the G.W.R., it seems to me that it can only be sought along the lines of the "Garratt" or other similar articulated designs.

Against the other British "Pacific" design—the Raven 4-6-2 of the N.E.R.—it is hardly possible to allege failure, as, in the interchange working between No. 2400 and a Gresley "Pacific" between Doncaster and King's Cross, in the early days of both types, there was, I believe, but little difference in coal consumption as between the two engines, and the work performed, on a load and time basis, was practical identical. As to relative costs of maintenance I have no figures; but, with 52 of the former type at work and but 5 of the latter, extinction of the minority was practically bound to occur in any case, with a view to standardisation. So much for my friend's letter. I would repeat that I agree with his main contention, but I arrive at my conclusion by an avenue differing from his.

And now for those journeys on *Enterprise*, which I have been enabled to make by the courtesy of Mr. W. G. P. Maclure, the Running Superintendent of the Southern Area of the L.N.E.R. The first trip was on the 8.40 a.m. from Doncaster to King's Cross, which has the fastest start-to-stop booking of the Great Northern Section, running from Grantham to London in 111 min. It was a clear and still morning, and the task of the great engine in hauling a train whose tare weight only reached a maximum of 300 tons—from Retford—was simplicity itself. Driver Tomblin even took matters a shade too easily as far as Retford, keeping the regulator mostly at about one-half open, and bringing back the cut-off to 20 per cent. at Black Carr Junction, and further to 15 per cent. after we had topped the 1 in 198 rise to Piper's Wood. But the allowance of 5 min. at Retford was more than ample for the attachment of the Sheffield coach, and we got away again to time. From Retford, Driver Tomblin started away in 60 per cent. cut-off, soon brought back to 25 per cent. at Grove Road and 15 per cent. at Gamston (3 miles from the start), which sufficed to maintain 44 m.p.h. over the upper part of the 1 in 178—200 climb to Markham. Regulator two-thirds open was maintained throughout the climb, and after that about three-fifths; 15 per cent. cut-off was used from Markham to Newark, and 16 per cent. from there up to Grantham. With such easy working of the engine as this, speed fell to 47 m.p.h. up the 1 in 200 to Peascliffe Tunnel, but time was kept to Grantham without difficulty.

We overstayed our allowance at Grant-

L.N.E.R.

8.40 A.M. DONCASTER—KING'S CROSS.
Engine: Super-"Pacific" No. 4480 *Enterprise*.
Load: *300 tons tare; *315 tons full.
Driver: Tomblin. Fireman: Fisher.

Distance.	——	Sched.	Actual.	Speeds
Miles.		min.	min. sec.	m.p.h.
0·0	Doncaster ..	0	0 00	—
4·7	Rossington ..	—	7 10	—
6·5	Piper's Wood ..	—	9 20	48½
8·3	Bawtry.. ..	—	11 15	—
12·1	Ranskill ..	—	14 45	65
17·4	Retford ..	20	21 10	—
4·9	Markham ..	—	7 45	44
12·2	Carlton.. ..	—	14 40	71½
18·5	Newark ..	20	20 35	61½
23·2	Claypole ..	—	25 10	—
27·1	Hougham ..	—	29 05	58½
28·9	Barkston ..	—	31 15	47
33·1	Grantham ..	37	37 05	—
3·5	Ponton.. ..	—	5 40	—
5·4	Stoke Box ..	—	8 10	48
8·4	Corby	—	11 15	—
13·3	Little Bytham	—	15 35	72½
16·9	Essendine ..	—	18 40	70½
20·7	Tallington ..	—	22 05	68
26·0	Werrington Jc.	—	27 00	64
29·1	Peterborough ..	31	30 40	20†
30·5	Fletton Jc. ..	—	33 00	—
36·1	Holme	—	38 45	65
42·0	Abbot's Ripton	—	44 45	49
46·6	Huntingdon ..	50	49 45	68
49·5	Offord	—	52 25	66
53·8	St. Neot's ..	—	56 35	60
58·0	Tempsford ..	—	60 40	67
61·4	Sandy	—	63 45	66
64·4	Biggleswade ..	—	66 30	64
68·5	Arlesey.. ..	—	70 35	59
69·8	Three Counties	—	71 55	64
73·6	Hitchin ..	77	75 55	—
76·9	Stevenage ..	—	80 05	47
80·5	Knebworth ..	—	84 05	—
83·5	Welwyn ..	—	87 25	—
87·8	Hatfield ..	92	91 20	70½
92·8	Potter's Bar ..	—	96 05	64
96·3	New Barnet ..	—	99 10	—
			p.w.s.	40
102·9	Finsbury Park	—	105 40	—
105·5	King's Cross ..	111	109 30	—

* 267/280 tons Doncaster to Retford.
† Service slack.

Digitized by Google

L.N.E.R.

Engine: Super-"Pacific" No. 4480 *Enterprise*.
Driver: Tomblin. Fireman: Fisher.

Distance.	Train.	5.45 p.m.		10.10 a.m.	
	Load: axles	58		52*	
	,, tons tare	430		417	
	,, tons full	460		440	
Miles		Sched.	Actual.	Sched.	Actual
		min.	m. s.	min.	m. s.
0·0	King's Cross ..	0	0 00	0	0 00
2·6	Finsbury Park	—	5 30	—	5 30
5·0	Wood Green ..	—	8 35	—	8 40
9·2	New Barnet ..	—	14 20	—	14 15
12·7	Potter's Bar ..	—	19 50	—	19 35
17·7	Hatfield ..	27	25 50	25	25 15
22·0	Welwyn ..	—	30 20	—	29 45
25·0	Knebworth ..	—	34 05	—	33 45
28·6	Stevenage ..	—	38 00	—	37 45
31·9	Hitchin ..	41	41 15	39	41 00
37·0	Arlesey ..	—	45 40	—	45 15
41·1	Biggleswade ..	—	49 25	—	48 45
44·1	Sandy.. ..	—	52 00	—	51 25
47·5	Tempsford ..	—	55 05	—	54 35
51·7	St. Neot's ..	—	59 10	—	58 45
56·0	Offord.. ..	—	62 55	—	62 40
58·9	Huntingdon ..	65	65 25	64	65 15
62·0	Leys Box ..	—	69 05	—	68 25
63·5	Abbot's Ripton	—	70 40	—	70 00
69·4	Holme ..	—	75 55	—	75 00
72·6	Yaxley ..	—	79 00	—	78 05
75·0	Fletton Jc. ..	—	81 35	—	80 25
76·4	Peterborough	84	83 50	83	82 45

* Including quintuple articulated restaurant-car set.

ham by 1¼ min., but a delay ten times as great would have caused little concern to engine or driver. Indeed, on the Wednesday of the following week, when No. 4480 was working the 11.4 a.m. from Doncaster to King's Cross—the hardest turn of the day—with the handicap of the additional stop at Newark, the 29·1 miles from Grantham to Peterborough stop were run in 25½ min., ascent to Stoke included, with over 400 tons. On this occasion, with the continuous climb of 5½ miles at 1 in 200 in front of us, we started in 60 per cent. cut-off, brought back to 40 at the South Box, 30 at the North Road overbridge, 25 at Saltersford (only 1½ miles from the start), and 20 before Great Ponton, despite which, on about a three-quarters regulator, we attained and maintained 48 m.p.h. to the summit. The very easiest working then ensued to Peterborough, cut-off varying between 16 and 14 per cent., and the regulator being closed to the extent of reducing the pressure from 210 lb. in the boiler to no more than 120 lb. in the steam-chest.

On the Gresley "Pacifics," alone, to my knowledge, among British express locomotives, the driver is provided with valuable assistance towards efficient working of the engine in the shape of a pressure-gauge communicating directly with the steam-chest. It was particularly interesting to note that whenever the engine was working reasonably hard, as, for example, on the rising grades, the proportion of steam-chest to boiler pressure varied between 82 and 90 per cent., showing that the 85 per cent. generally employed in the tractive force calculation is a fair average figure. It was only when the regulator had to be partially closed, to avoid excessive gains on time, that the effect of throttling was made evident by a drastic fall in the steam-chest pressure. Actually, *Enterprise* was blowing off at about 210 lb., instead of the rated 220 lb., and Driver Tomblin appeared to aim at maintaining his steam-chest pressure round about 175 lb.—83 per cent. of boiler pressure—slightly varying his cut-off or regulator opening when necessary in order to do so. The highest percentage that we reached—180 lb. in the steam-chest as against 200 lb. in the boiler, or 90 per cent.—was on passing Stoke Box. Throughout the run the pressure remained at between 200 and 210 lb., with occasional spells of blowing off, not exceeding 5 secs. at a time.

Little need be said concerning the remainder of the journey, from Peterborough to London. The general cut-off position was 15 per cent., from Leys Summit onwards, with increases to 16 per cent. up Ripton bank, and from Hatfield to Potter's Bar, between which two stations we achieved the notable time of 4 min. 45 secs., and a minimum rate no lower than 64 m.p.h. All the way up the lengthy ascent to Stevenage, Driver Tomblin was content to stick to 15 per cent. cut-off, despite which no lower speed than 47 m.p.h. was noted on the 1 in 200. Owing to our late start from Grantham, we were still the merest shade behind time through Hatfield, but the brilliant finish, Oakleigh Park

Digitized by Google

Tunnel slack notwithstanding, completed our journey in 109½ min., or a little under 109 min. net—probably about 108¾ min.

The loads on my two down journeys were a somewhat different proposition for the engine. I selected the 5.45 p.m. down on a Friday evening, when the train was made up to ten 8-wheelers and three 12-wheeled dining cars, so that our total load was 460 tons behind the tender. It was a beautifully clear and frosty evening in November, and we made a perfect start, without an atom of slipping. From 60 per cent. on starting, Tomblin reduced his cut-off to 50 at Copenhagen Tunnel, and 30 when we were well over the top of the 1 in 105 rise to Holloway, but we sailed triumphantly through Finsbury Park exactly 5½ min. after starting. Here cut-off was reduced to 25 per cent.; Harringay saw a further reduction to 20 per cent. and Hornsey to 15 per cent. But the load and the 1 in 200 required a rather harder effort than this, so that at New Southgate we opened out again to 17 per cent., and above New Barnet to 20 per cent.; the resultant speeds were 55½ m.p.h. at Wood Green, 45 at New Southgate, 41½ at New Barnet and an acceleration to 42½, in consequence of the increased cut-off, from Hadley Wood to Potter's Bar.

From Potter's Bar to Peterborough 15 per cent. cut-off sufficed for time-keeping throughout, slight changes being made from time to time in the regulator opening; speeds were 66 m.p.h. at Hatfield, 46½ at Woolmer Green (the regulator had been partly closed on this ascent, as we were, from the evidence of distant signals at danger in the distance, close on the heels of the 5.37 down), 71½ at Three Counties, 62½ at St. Neot's, 69 at Offord, 50½ at Leys Box, 72½ at Holme (here we were running on 13 per cent. cut-off), and 55½ before shutting off steam at Fletton Junction. After Peterborough the run was spoiled by adverse signals, which brought us to a dead stand at Little Bytham. On 16 per cent. cut-off and a three-quarters regulator from Werrington to Tallington we had attained 60 m.p.h. on the level, with 460 tons, passing Essendine in exactly 15 min., but the rest of the journey was of little moment. Throughout this trip also pressure was well maintained at between 200 and 210 lb., and if Fireman Fisher was shifting anything more than 40 lb. of coal to the mile from tender to firebox, I should be greatly surprised. "Look at my mate," remarked Tomblin to me between a couple of spells of firing; "he's got nothing to do"!

The journey on the 10.10 a.m. down

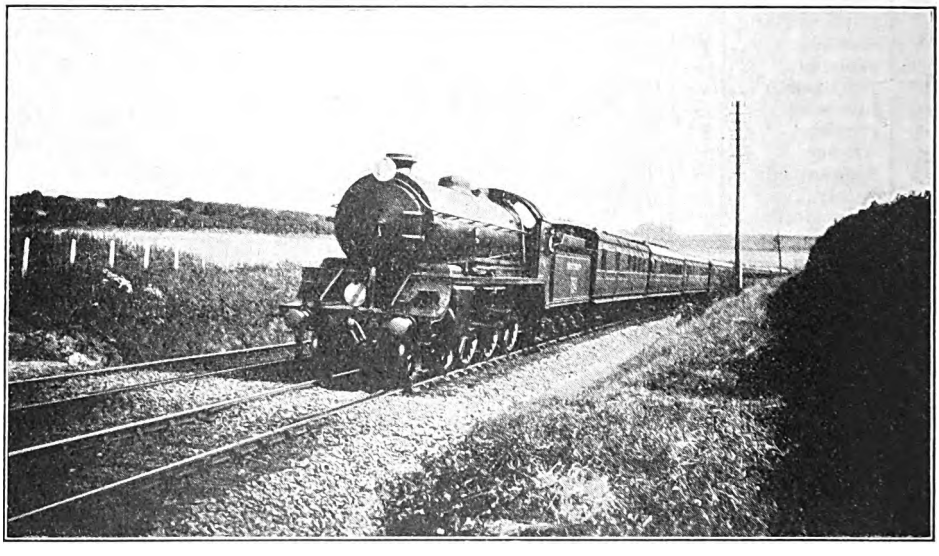


Photo.] [*F. J. Arthur.*

DOWN WEST OF ENGLAND EXPRESS AT HEWISH SUMMIT.
4-6-0 Locomotive No. 754, *The Green Knight.*

Digitized by Google

was made on a Monday, for "load-catching" purposes, and we went out of King's Cross with 440 tons; in the estimation of drivers, however, the extra frictional resistance occasioned by the demands of the electric cooking appliances on this train are worth a substantial tare tonnage above the 118 tons of the articulated set. In any case, the effort demanded of the engine probably differed but little from that required on the 5.45 p.m. down, and there was a very close correspondence in the running times. For the first 60 miles, indeed, there was no greater difference than 40 secs. at any point between the two runs. Once again we breasted Finsbury Park in exactly 5½ min., cut-off being reduced to 40 per cent. at the top of Holloway Bank, 25 per cent. at Finsbury Park, 22 per cent. at Harringay, 20 per cent. at Hornsey, and 17 per cent. at Wood Green; but we reverted to 22 per cent. from New Barnet up to Potter's Bar. Thenceforward 15 per cent. was used once again, until Huntingdon, where 22 per cent. up to Leys resulted in no greater drop than from 67 to 54 m.p.h. up the 1 in 200; 15 per cent. down Ripton bank brought us up to 74 m.p.h.

Prior to that speeds had been 55 m.p.h. at Wood Green, 40 at New Barnet, 38½ at Potter's Bar, 66 at Hatfield, 43 at Woolmer Green—it was here that the pressure had dropped to 170 lb., the speed suffering in consequence—77½ at Three Counties, 64½ at Sandy, 69 at Tempsford, 60 at St. Neot's, 71½ at Offord, and, as just mentioned, 67 at Huntingdon, 54 at Leys Box and 74 at Holme. Overall time was thus kept without difficulty, and the worst discrepancy in intermediate time observation was the 2 min. by which we were out at Hitchin; though why this train should be required to pass Hitchin in 2 min. less than the 5.45 p.m. down, and to take a minute more from there to Huntingdon, is not quite clear. By Yaxley, Fireman Fisher had his pressure up again to 200 lb., and all was well. I sought the interior of the train from Peterborough to Grantham, where time was very closely observed; we took 15¼ min. to Essendine, 29 min. 35 sec. to Stoke, and 35¾ min. to Grantham stop.

It is thus evident that in the rebuilding of *Enterprise* Mr. Gresley has improved the working of the engine in a very remarkable degree. The general working position of the cut-off has been brought down from 35 or 40 per cent. to 15 per cent., without any reduction in the exceptional tractive capacity of the engines. The contents of these columns have proved, time and again, that the Gresley "Pacifics" have been fully equal to any tasks set before them, whether it be high speed running in the recovery of arrears of time, or the unaided working of vast loads, up to and exceeding 600 tons, without loss of time. I have been reminded of those capabilities by a letter received from one of my most valued correspondents and friends, who recently made his first L.N.E.R. journey from Leeds to London and back. For the up trip he chose the 10.15 a.m. express, and having his family with him, took but little notice of the running, except, fortunately, to note that the departure from Peterborough was 10 min. 5 sec. late. Expecting a correspondingly late arrival at King's Cross, he was astonished to find that the journey of 76·4 miles, instead of having occupied the stiff schedule time—with this load—of 82 min., had actually been completed in 76 min. 50 sec., start-to-stop, the last 50 miles to town taking only 47 min. 55 sec. The load, I have since ascertained, was 422 tare tons, probably 445 tons full. The engine was No. 4471, *Sir Frederick Banbury*, driven by Maw of Doncaster.

Returning three weeks later, my friend found the first part of the 4 p.m. down Leeds express made up to 15 coaches, or 62 axles, taring 463 tons and gross. 500 tons. Finsbury Park was passed in 6 min. 10 sec., Potter's Bar in 19 min. 50 sec., and Hatfield in 25 min. 25 sec., but for some special reason a stop was made at Hitchin, in 39 min. 55 sec. from King's Cross. After standing there for 80 sec., *Gay Crusader*, which was the engine concerned, actually ran the 44·5 miles on to Peterborough, with 500 tons, in 43 min. 30 sec., start-to-stop, arriving there 3¼ min. early! Sandy, 12·2 miles, was passed in 12 min. 50 sec., Huntingdon, 27 miles, in 25 min. 45 sec., and Holme, 27·5 miles, in 25 min. 50 sec. My friend remarks on the extraordinarily close correspondence between these times and some which I gave prominence to in December, 1926, when the same engine, with 530 tons, took exactly the same time

Digitized by Google

from Sandy to Huntingdon, 5 sec. less from Huntingdon to Holme, and 15 sec. less from there to Peterborough, so that the gaiety of the *Gay Crusader* appears to be a regular habit! Jackson, of Doncaster, was the driver. For such a first experience of the working of the Gresley "Pacifics," my correspondent is to be congratulated, and it is needless to say that his opinion of their capabilities is of the most enthusiastic order.

In the conversion of *Enterprise*, while the abilities just referred to remain unimpaired, and are, indeed, increased, they are accompanied by as remarkable an economy in the running of the engine, resulting from the higher pressure, increased valve-travel and short cut-off working, as is expressed by the reduction in coal consumption from 55 to something under 40 lb. per mile, on all duties.

Large coal economies have also been realised by the 180 lb. "Pacifics" whose valve-setting has been similarly altered, and it will be a matter of considerable interest when figures can be produced as to the relative ultimate economies of "Pacifics" and super-"Pacifics." As between the design of *Enterprise* and Great Western locomotive practice, finally expressed in the "King" class, there are still wide divergencies, as, for example, in the size of piston-valves, length of stroke in relation to cylinder diameter, and particularly in the matter of superheating, the former engine being fitted with 41 superheater elements as against the latter's 16, resulting in a far higher degree of superheat in the case of the L.N.E.R. engine, but such contentious matters as these must form the subject of later discussion.

During the past month I have received letters from F. D. Barmby, C. H. B. Burnell, D. H. Dew, E. W. Maybank, Lt.-Col. K. N. Reed, and W. C. White, to whom my thanks are due.

SENTINEL LOCOMOTIVE NO. 1, GREAT SOUTHERN RAILWAYS, IRELAND.

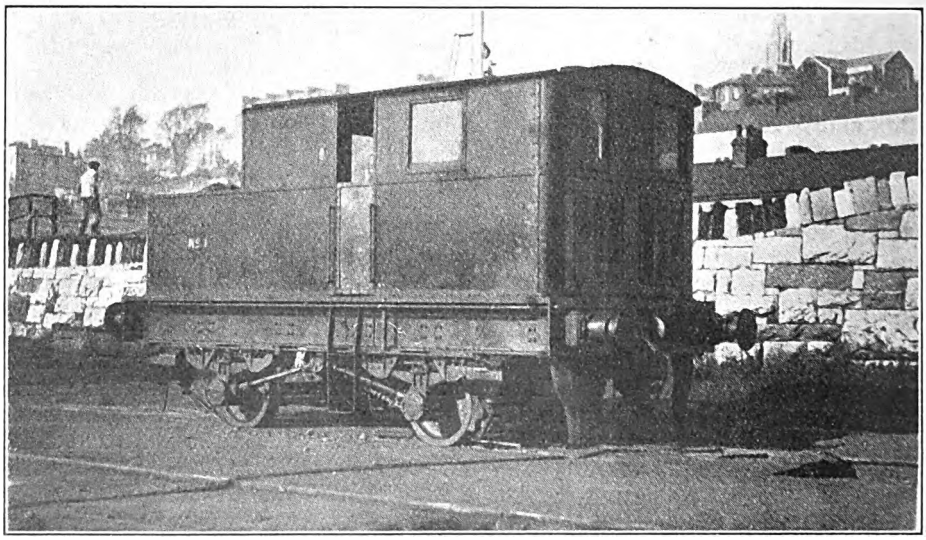
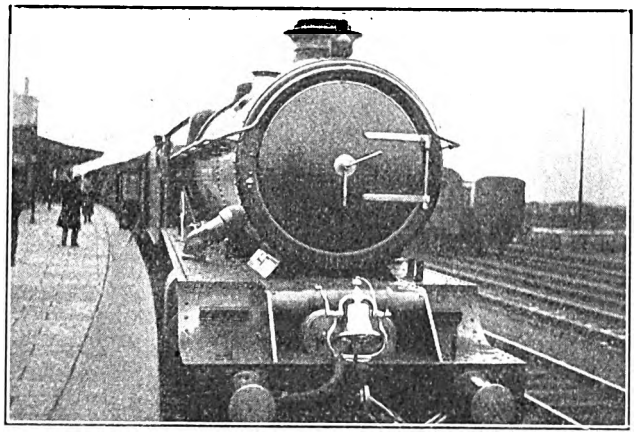


Photo.] USED ON CASTLE ISLAND BRANCH. [*R. Murphy.*

Built by the Sentinel Waggon Works Limited. Photographed at Cork.

Digitized by Google

G.W.R. Locomotive "King George V" in America.



"KING GEORGE V" LOCOMOTIVE AGAIN RUNNING ON G.W.R. WITH BELL PRESENTED BY BALTIMORE & OHIO RAILROAD.

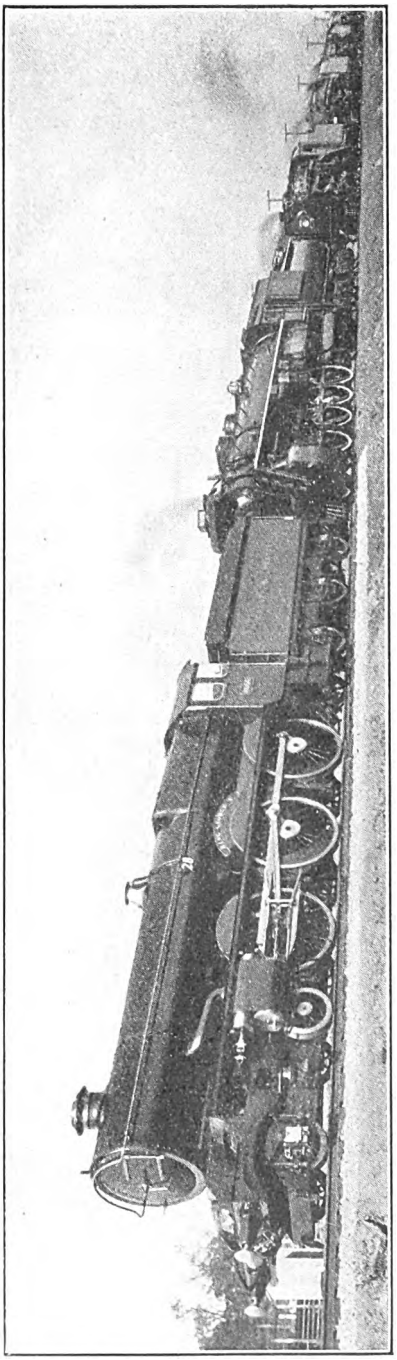
VERY considerable interest was aroused at the Centenary celebrations of the Baltimore & Ohio Railroad by the presence there of the G.W. Railway express locomotive *King George V*, the first of a new series built during the past year at the Swindon works. The engine was sent out from this country in August last, and was shown at the "Fair of the Iron Horse," the name given to the Centenary Exhibition and Pageant of the Baltimore & Ohio Railroad, which opened on September 24 and closed October 15. Over 1,250,000 people visited the Exhibition, and, as Mr. W. A. Stanier, assistant to chief mechanical engineer, Great Western Railway, who accompanied the engine throughout its visit, states in an interesting article appearing in the December issue of the *Great Western Railway Magazine*, so impressed were the mechanics at the railway company's shops at Mount Clare, where the *King George V* was assembled after disembarkation, that they remarked, "It is not a locomotive, but an automobile."

The G.W.R. engine led the procession of big locomotives and was accorded a great reception on every occasion. The general public, as well as the railway officers, noted particularly the absence of smoke, both when standing and when running on the track. The exhibition was visited by a very large number of American railway officers, who greatly admired the simplicity and workmanship of the engine, and, indeed, Mr. Stanier reports that the vice-president of one of the railroads told his superintendent of motive power that he thought they would have to take a course of lectures on art during the present winter, and study the meaning of "line" and outline before they ventured on any new design. Among the many visitors to the engine was Mr. Henry Ford, who, after the pageant came specially to the engine to have a short trip on the track. He commented on the smoothness of the working of the locomotive, and was very interested when he heard it was of the 4-cylinder type. He had numerous photographs taken, and said he intended to make a model of the engine.

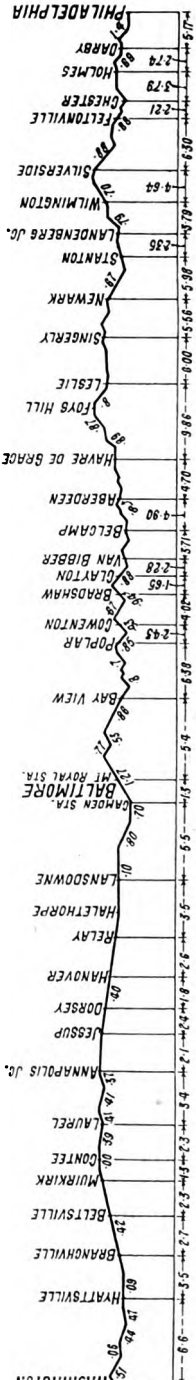
The absence of the large headlight customary on American locomotives, and also of the bell, which invariably forms part of their equipment, was commented upon freely, it being apparently difficult for the American citizen to appreciate the fact that railways in Great Britain are fenced from end to end, and rank as private property, on which no one may trespass with impunity.

The Baltimore & Ohio Railroad afforded facilities for the engine *King George V* to be tested on their lines, and subsequently issued a report on the performances of the engine. This report covers test runs made with heavy trains, in the make-up of which a dynamometer car was included. The runs were made between Baltimore and Washington, Washington and Philadelphia, and Philadelphia and Baltimore. The *King George V* was handled by the regular G.W. crew, piloted by a B. & O. engineman. The weather, according to the report, was at times cloudy and raining, with temperature

Digitized by Google



THE "KING GEORGE V" LOCOMOTIVE HEADING PROCESSION OF LOCOMOTIVES.



CONDENSED GRADIENT PROFILE, WASHINGTON TO PHILADELPHIA.

Digitized by Google

from 56° to 60° F. Dynamometer chronograph records were taken of the drawbar pull, speeds, boiler pressure, regulator and reversing gear positions, but no record was kept of the coal and water consumption.

The train was made up as follows :—

	Weight, Tons.
Dynamometer car No. 930 ..	65·0
Coach 5411	76·2
Coach 5427	76·2
Coach 5422	76·2
Pullman sleeper *East Falls* ..	80·0
Pullman sleeper *Loch Awe* ..	80·0
Official car No. 97	90·0
Total tonnage	543·6

This report is reproduced in some detail in the December issue of the *G.W.R. Magazine*, and in it the performance is classified as a very creditable one, and especially so as the engine crew were not familiar either with the road or quality of fuel used, while the small size of the air pump had some adverse effect on the conditions. No attempt was made to exceed any former speed records, and in spite of the fact that the train weighed 543·6 tons, no difficulty was experienced at any time in starting or in hauling the train.

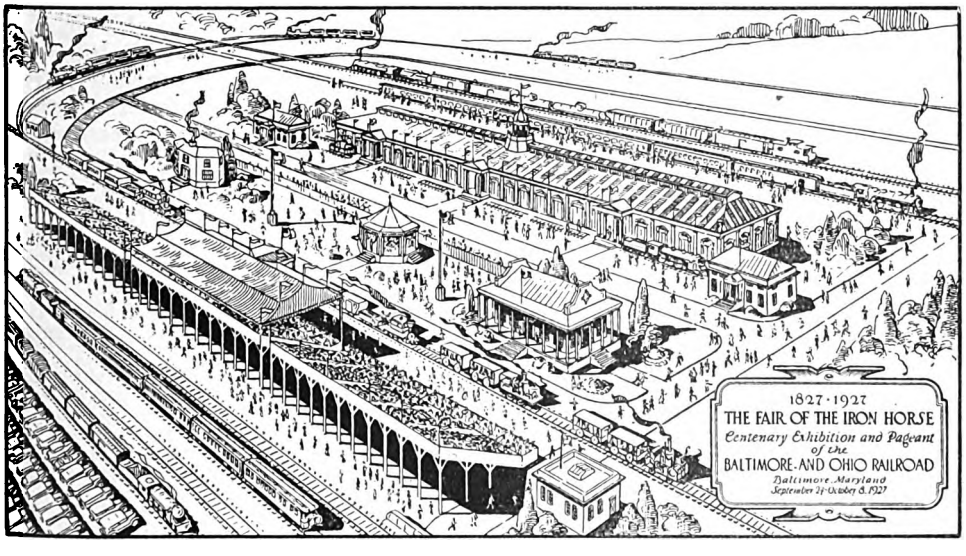
On the run from Baltimore to Washington, a distance of 38 miles, the maximum speed reached was 74 m.p.h., with maximum drawbar pull 21,800 lb., this being noted at the second mile-post, which was passed at 20 m.p.h., and average speed from the start, 13 m.p.h. The highest average drawbar pull amounted to 15,500 lb., this being noted at mile-post 6, at which point the speed was 34 m.p.h. Summarised, this run from Baltimore to Washington may be taken to read as follows :—

Left Baltimore, Camden station	8.29 a.m.
Arrived Washington, "QN" Tower	9.32.5 a.m.
Elapsed time	1 hr. 3 min. 5 sec.
Delays	4 min. 20 sec.
In motion	58 min. 45 sec.

Another test run, namely, that between Washington and Philadelphia, a distance of 134 miles, gave summarised results as follow :—

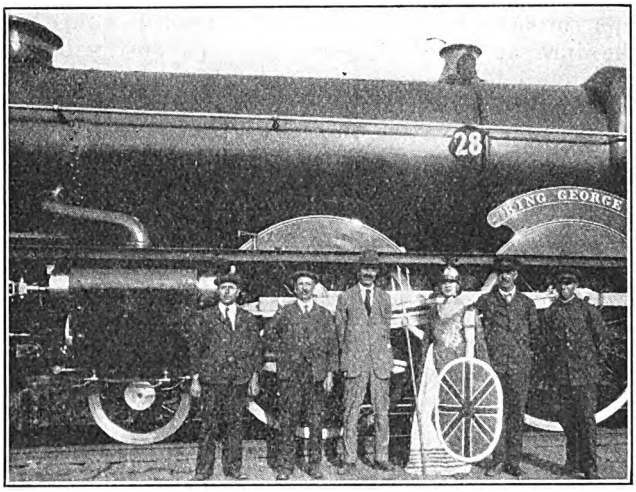
Left Washington, New York Avenue	9.54 a.m.
Arrived Philadelphia, Chestnut Street	1.6.55 p.m.
Elapsed time	3 hr. 12 min. 55 sec.
Delays	16 in. 55 sec.
In motion	2 hr. 56 min.

On this run the maximum speed attained was 73 m.p.h., with maximum drawbar pull 23,700 lb. It appears that the boiler pressure throughout never fell below 200 lb. per square inch, the maximum recorded being 240 lb. per square inch.



SKETCH VIEW OF THE EXHIBITION GROUND.

Digitized by Google



MR. W. A. STANIER, WITH "BRITANNIA," DRIVER YOUNG AND FIREMAN PEARCE, AND TWO SWINDON MECHANICS.

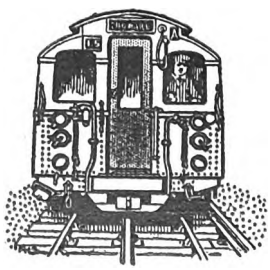
The fuel used was a hard gas coal, and hardly suitable for long runs with the type of grate fitted to the engine. Mr. Stanier reports that a certain amount of difficulty was experienced in maintaining steam at full pressure on account of the amount of clinker which formed on the bars. It must also be remembered that neither engineman Young nor fireman Pearce knew the road or the coal. The railway officials who travelled with the train were, however, very satisfied with the result, and particularly pleased with the riding of the engine, the way it took the curves, and its general smooth working. The B. & O. Company did not desire speeds in excess of 65 m.p.h. on this section of the line, on account of curves and the numerous grade crossings. Representatives of the Pennsylvania and Delaware & Hudson Railroads were on the train, in addition to many of the B. & O. officers.

On the run from Washington to Philadelphia it was necessary to make a stop at Camden station (Baltimore), and also at Elk Mills, for water, it being impracticable to take up water from the troughs, for the reason that the latter are below the rail level, making it impossible for the *King George V* to use them, its pick-up scoop when fully lowered riding above the water level.

The final run was made in taking the train back from Philadelphia to Baltimore. On this run the maximum speed reached was 69·3 m.p.h., maximum drawbar pull 19,500 lb., with steam pressure 245 lb. per square inch maximum, and 200 lb. minimum. Summarised, this last-named run gives results as follow:—

Left Philadelphia, Chestnut Street	2.43 p.m.
Arrived Baltimore, Camden station	5.5.45 p.m.
Elapsed time	2 hr. 22 min. 45 sec.
Delays	7 min. 55 sec.
In motion	2 hr. 14 min. 50 sec.

It was recorded that the maximum drawbar pull developed by the locomotive was 26,000 lb., this being when starting out from Camden after the tests ended.



Digitized by Google

RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. Applications for information concerning "British Locomotive Practice and Performance" may be addressed to Mr. Cecil J. Allen, c/o* RAILWAY MAGAZINE, 33, *Tothill Street, Westminster, London, S.W.1. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book"* (5*s. net*) *should be consulted. The thirtieth Annual Edition* (1927) *of this standard railway reference work is now published. All previous Editions are out of print.*

Snow Hill Incline.

For many years L.C. & D. trains worked from Ludgate Hill, *via* Snow Hill and Aldersgate, to Moorgate. There were also certain trains which made Snow Hill (later re-named Holborn Low Level) their terminus, reversing in sidings at the foot of the incline. This latter practice was also adopted by L. & S.W. trains. There were also Great Northern, Midland and L.C. & D. trains, working between Victoria and various destinations on the Great Northern and Midland lines, which passed through Snow Hill to continue *via* Farringdon Street and King's Cross (Met.) to their northern destinations. The L.C. & D. trains worked to and from both the Great Northern and the Midland lines as balancing services for the G.N. and Midland trains to and from Victoria. There were also a few South Eastern trains *via* Blackfriars curve, Snow Hill and Farringdon Street, and thence to the Great Northern system. All these services were gradually reduced and with the war were entirely discontinued. The trains in question were distributed throughout the day, though the L.C. & D. trains to Moorgate were operated in considerable numbers morning and evening and on Saturday afternoons, as in the case of the present G.N. and Midland services. On all these services the ordinary suburban engines were used, and it was not usually necessary to use the banking engine stationed at the foot of the Snow Hill incline which was, and still is, provided mainly to assist goods trains.

[Reply to "PASTSEEKER."]

Locomotive Boiler Centre-lines.

Various considerations affect the level above the rails at which a locomotive boiler is pitched. A high centre-line is often compelled by the necessity of clearing the driving wheels, in the case of express engines, and leaving adequate room for motion parts, especially the cranks and big-ends of connecting rods; it is also of considerable value in rendering more accessible those parts of the motion of the engine which may be located between the frames. At times when the boiler of an engine may appear pitched unnecessarily high, the position may be dictated by the use of a boiler and firebox which is standard with those carried by other types; it may, yet again, be due to the necessity for fitting the firegrate above coupled axles. There are certain advantages, also, attaching to the raising of the centre of gravity of the engine as a whole, which results from the raised pitch of the boiler; the effect of the running of the engine on

Digitized by Google

the track is held thereby to be somewhat eased.

[Reply to E. J. DAVEY.]

Seaboard Air Line.

Mr. H. E. Underwood writes :—" This U.S.A. system is so called because its main line follows the Atlantic Seaboard from Richmond to Florida (both East and West coasts), and has between many points a considerably shorter and straighter route than that of its chief rival, the Atlantic Coast Line, and in some cases that of the Southern system. The total distance between Richmond, Va., and Jacksonville, Fla., is 681 miles by the A.C.L. and 639 by the S.A.L. ; between Charleston, S.C., and Savannah, Ga., for instance, the mileage is 111 and 95 respectively. An Air Line in the U.S.A. is generally understood to mean a direct line over the shortest possible route. It may be mentioned that the Michigan Central Railroad has its main line from Chicago to Detroit (double track), *via* Kalamazoo and Battle Creek, doubled by an " Air Line " (single track) 13 miles shorter, *via* Fairfax and Homer.

Mr. Charles E. Lee also writes :—" The term ' Air Line ' is a well-known American phrase which was current some 60 years ago and was included in the title of many of the smaller American railway companies then incorporated. It means *direct* and is comparable with our own phrase ' bee line.' Apart from the seaboard, there are still some owning concerns bearing similar titles, as, for instance, the Atlanta & Charlotte Air Line Railway Company, and the Boston and New York Air Line Railroad ; though so far as I am aware the Seaboard Air Line is the only operating company of any size still so named. It is interesting to recall, that, at about the same period, a number of British companies received titles containing the word ' direct,' such as the Horsham and Guildford Direct Railway Company."

[Further replies to MEYRICK J. H. CRAMB.]

Caprotti Valve Gear.

A number of L.M.S. engines are to be fitted with this gear, and nine sets have been ordered from Beardmore & Company.

[Reply to C. R. PRESCOTT.]

Gradients.

Mr. Gordon W. G. Cass writes as follows : " There are three noteworthy inclines on the High Peak line, two of them, the ' Sheep Pasture ' and the ' Middleton,' having gradients of 1 in 8 and 1 in 8½ respectively, whilst the third, to which your correspondent refers, is known as the ' Hopton Incline,' with a gradient of 1 in 14. The first two are operated by rope haulage, but the last-named is (or, at any rate, used to be) worked by adhesion alone. The method employed is for the locomotive to push its load of two wagons before it, gaining speed down a slightly falling grade immediately prior to the climb ; thus, the incline is rushed and if, owing to greasy rails, &c., the top is not reached after two attempts, the load is divided. Small tank engines of the L.M.S. Western Division are usually employed."

[Further reply to " WILBRAHAM ROAD."]

Signalling at Colchester, L.N.E.R.

Your query as to the special feature of the signalling as affecting the triangle between Hythe, St. Botolphs and East Gates Junction is answered by an article published in our issue of March, 1926. From this you will see that there is no signal box at the actual junction between the Hythe and the East Gates lines towards St. Botolphs, the East Gates box having control. Consequently, East Gates box constitutes, in effect, the intermediate box between Hythe and St. Botolphs station, and has, therefore, to deal also with the movements of trains running direct from Hythe to St. Botolphs, as well as those which actually pass East Gates box. The Colchester accident in August, 1913, was due to a light engine being allowed to occupy the line in front of an express.

[Reply to R. M. CLARKE.]

Midland Junctions near Leeds, L.M.S.

The fly-over between Kirkstall and Armley is chiefly intended to pass the express passenger traffic between Bradford and Leeds over the freight traffic between the Worth Valley main line and the south without the two fouling each other, although both sets of lines are actually used for fast trains as may be most convenient at the particular time. We

Digitized by Google

are quite at a loss to understand your second query, as the interlocking of switches required by statute would make such a setting of points at a junction a total impossibility. We have noted with interest the details you send of an express L.N.E. excursion run from Bradford to Leicester *via* Doncaster, Newark, and Nottingham (with a reversal of direction at Nottingham (Victoria))—a most unusual route.

[Reply to RONALD L. CLARE.]

Sligo, Leitrim and Northern Counties Railway.

Mr. C. J. Coghlan writes as follows in regard to a reply previously given:—Running from Enniskillen through Belcoo, Manorhamilton, Dromahair to Collooney 41½ miles, it exercises running powers over the Western section of the G.S. Railways for 6½ miles into Sligo. The line is of the standard Irish gauge, 5 ft. 3 in., and was opened in 1882. It forms a link between the G.N.R.(I.) at Enniskillen and the G.S. Railways. Of course, it escaped the amalgamation of the Free State railways in 1924 because about 14 miles of the line are in Northern Ireland. The headquarters of the company is Enniskillen.

[Further reply to G. E. FENTON.]

Scrapping of Locomotives.

The fact that one or two engines of a numerous class have been scrapped at a comparatively early age does not necessarily mean that the class as a whole has been superseded. Generally, it will be found that the condition of the particular engines in question has been such that it was thought better to withdraw them from service rather than to incur heavy expense in reconstructing them. This may be due to the fact that the engines have been concerned in mishaps or that, for some reason or other, they were in worse condition than the general standard of the class.

[Reply to "NORTHWESTERN."]

S.R. Locomotive at Maidenhead.

A number of readers write to point out that the 2.25 p.m. G.W.R. train from Reading to Maidenhead is regularly worked by a Southern Railway 0-4-4 tank locomotive, usually No. 111E from Reading shed. The engine returns with the 3.12 p.m. from Maidenhead, and this is an instance of a working which balances duties performed by the G.W.R. over other sections of the S.R.

[Further reply to "STAFFORDSHIRE KNOT."]

L.M.S. and L.N.E.R. Locomotives.

The L.N.E. 3-cylinder 4-6-2 locomotive *Enterprise* develops a tractive effort at 85 per cent. boiler pressure of 37,465 lb. The 3-cylinder 4-6-0 engines of the L.M.S.R. "Royal Scot" class exert a tractive effort of 33,150 lb. at 85 per cent. of the boiler pressure and, therefore, on this basis, the L.N.E.R. 4-6-2 with the 220 lb. per sq. in. boiler pressure is the more powerful.

[Reply to J. H. BILES.]

Colour Plates.

While we appreciate the desire of many readers for coloured frontispieces in each issue, as was the case in pre-war days, it is necessary for them to remember that the costs involved are very much greater than those of one-colour frontispieces, while the expense of production is very high as compared with that which applied in the pre-war period.

[Reply to F. V. W.]

Wirral Railway Locomotives.

A Derby reader mentions that he noted one of the 2-4-2 tank locomotives of the former Wirral railway working on the Cockermouth, Keswick and Penrith section of the L.M.S.R. during August last. The engine had not been repainted, and still retained the Wirral railway number plate.

[Further reply to S. CANTRELL.]

Water Troughs, Shrewsbury and Hereford Line.

We are informed by several readers that the water-troughs between Shrewsbury and Hereford are located between Ludlow and Bromfield, just to the north of the former station, and not as stated in the October issue.

[Further reply to "COUNTY."]

"Garratt" Locomotive, L.N.E.R.

The duty of this engine is that of banking heavy coal trains up the 1 in 40 gradient of the Worsborough branch, between Barnsley and Penistone, and there is no

Digitized by Google

intention, so far as we are aware, of utilising its services further south.

[Reply to W. E. S.]

A Great Western Mystery.

The train to which you refer, leaving Ealing (Broadway) at 5.56 p.m., is a workmen's train from Greenford, and proceeds *via* the Central London (Ealing and Shepherd's Bush) line to Kensington (Addison Road).

[Reply to J. L. MAWHOOD.]

"Notable Railway Stations."

The following Nottingham stations have been described in this series of articles: Nottingham (Midland), October, 1904; Nottingham (Victoria), December, 1900, and September, 1926. These issues are, however, now out of print.

[Reply to BERNARD M. RUDGE.]

Articulated Suburban Trains, L.N.E.R.

We have not by us the exact weight of the quintuple articulated sets of coaches in use on the Great Eastern section of the L.N.E.R., but we believe it is about 90 tons, making 180 tons per complete train.

[Reply to G. PEMBER.]

An Unusual Locomotive.

We know of no outside-framed or double-framed 4-4-0 locomotive of any description belonging to the locomotive stock of the late Great Eastern Railway, and are at a loss to understand to what engine you can refer.

[Reply to "SUPER-CLAUD."]

Unusual Signalling.

Unless the multiple signals are provided to govern movements from and to *each* of the lines concerned we cannot understand their purpose. It may be, however, that some of the lower arms are for "calling on."

Photographs.

We are obliged for the photograph you sent of a Peckett tank at work in Wales, but regret that it is not large or detailed enough for reproduction. Photographs should be sent direct to the editor.

[Reply to N. JAMES.]

Swanley and Maidstone Line, S.R.

The distance from Otford to Kemsing is 2·9 miles; it was taken from the Railway Clearing House map of this area. We do not know the source of the discrepancy to which you refer.

[Reply to G. PEMBER.]

G.W.R. Locomotive Names.

The name of "King" class 4-cylinder 4-6-0 locomotive No. 6002 is *King William IV*, as stated in the October number of the RAILWAY MAGAZINE. The number of *King George II* of the same class is 6005.

[Reply to C. D. A.]

L.N.W.R. Compound Locomotives.

Except for one, or perhaps two, of the four-cylinder 4-4-0 compounds, we believe all the compound locomotives built by the late Mr. F. W. Webb have been either scrapped or rebuilt as simple engines.

[Reply to G. E. SHIPP.]

Loading Gauge, Australian Railways.

In Australia all new lines conform to a structure gauge 15 ft. high from rail, allowing for 10 ft. 6 in. width of stock. In New Zealand corresponding figures are 14 ft. and 9 ft.

[Reply to K. W. ARNOTT.]

Shed Plates, G.W.R. Locomotives.

The small plate bearing the letters which indicate the shed at which a G.W.R. locomotive is stationed is carried on the right-hand side of the footplate just under the cab roof.

[Reply to F. R. WHITING.]

L.M.S. 4-cylinder 4-6-0 Engines, Horwich Design.

Tractive effort of these engines, at 85 per cent. working pressure, is 28,880 lb. They have been times at speeds in excess of 80 m.p.h., on several occasions.

[Reply to "HIGHLAND CHIEFTAIN."]

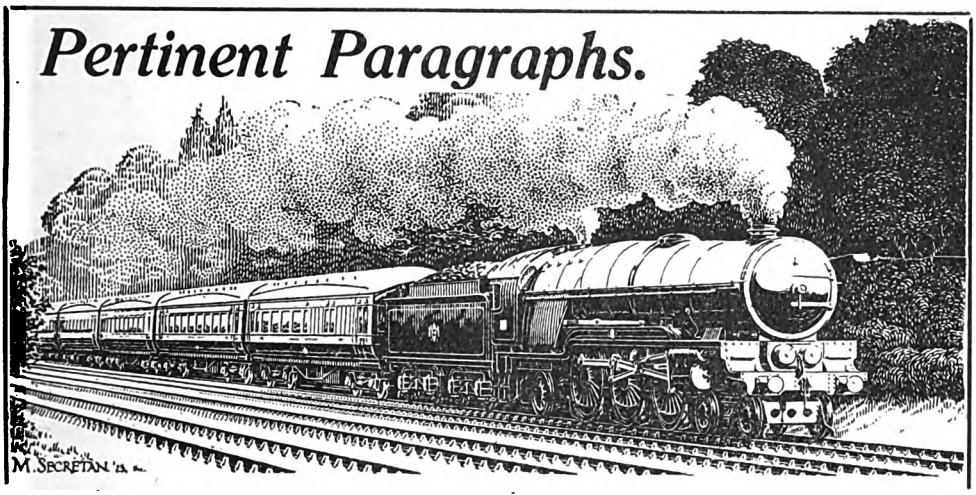
Tractive Effort.

On numberless occasions we have explained this term, and cannot recapitulate. See the short article on the subject in our January, 1927, issue.

[Reply to E. HANCOCK.]

Digitized by Google

Pertinent Paragraphs.



Economics of Industrial and Railway Amalgamations.

In his Presidential Address to the Railway Students' Association of the London School of Economics, on December 8, Sir Josiah Stamp, Chairman and President of the Executive, L.M.S.R., dealt chiefly with economic aspects of industrial and railway amalgamations. Although many of the remarks were of general application, Sir Josiah Stamp raised several interesting issues, while on the railway side he discussed more particularly various views as to the amalgamation of railways in the United States. He pointed out, however, that there are important differences between the amalgamation of industrial (including mining) undertakings and such concerns as railways. The analysis of the advantages claimed for the amalgamation of railways in the United States, which is given in detail, is an interesting one, and can be applied with little modification to the situation in this country. An important consideration, so far as railways are concerned, was that though the study of economics might suggest that certain railway routes could be closed, the restrictions due to geographical position are unavoidable, in that, as a rule, sections of line which do not pay must remain open if the district concerned is to retain its transport facilities. An instructive point raised incidentally, and supported by Sir Ralph Wedgwood, Chief General Manager, L.N.E.R., was that, so far as railways are concerned, the realisation of many of the economies claimed for, or rendered possible by, amalgamation may be in some instances an expensive matter. Sir Josiah also dealt at some length with the influences which widespread "trustification" would have upon transport conditions, and gave many illustrations of the fact that an "economy" to a particular institution was not necessarily an economy to the community.

The L.N.E.R. Invites Traders' Co-operation.

A letter has been sent out by Mr. George Davidson, Divisional General Manager, North Eastern Area, L.N.E.R., to traders in that area. This supplements a corresponding letter sent out in June last to the staff of the North Eastern Area, inviting their co-operation so far as they could supply information as to prospective traffic and in other ways, but is now addressed to the traders themselves. As Mr. Davidson explains, certain provisions of the Railways Act of 1921 and the work of the Railway Rates Tribunal have established a partnership between the railway companies and the traders in a form which has not hitherto existed, and both parties will in future have "a common financial interest in the prosperity of the railways." It is pointed out, however, that as the railway companies are expected to "manage the railways with efficiency and economy" and they will "leave no stone unturned" to keep their services up to the highest standard, there are several ways in which traders can co-operate and "incidentally contribute towards a reduction in charges." Traders are therefore asked to provide information as far as possible in advance of additional traffic expected, to give the railway the whole of their traffic for conveyance, and to avoid unnecessary detention of wagons.

Digitized by Google

Digitized by Google

Alterations at Exeter (Queen St.) (S.R.), 1925–1927.

THREE photographs sent by Mr. G. N. Southerden are reproduced on the opposite page. He sends also the following notes :—

The chief alterations consist of :—

(1) The extension of the up platform and line, up bay line, and (to a less extent) the up bay platform ;

(2) The conversion of the carriage siding in the station into a down through line ; and

(3) The building of two new signal boxes to replace three old ones.

The extension of the up platform involved the removal of the connection from the (then) up and down* goods line through the station to the goods yard. The goods line through the station became the up through line, and the up platform line being greatly extended, a scissors crossing was provided between these lines.

The old " C " box at the west end of the station was replaced by a new box on the up side of the line, allowing the carriage siding (which previously made a facing connection to the down main line) to be continued to form a down through line.

" A " and " B " boxes were replaced by a new box near the end of the extended platform : the other new box has already been mentioned. In each case the signalman has his back to the running lines when working the levers.

The distant signals—one only in each direction as before—show orange lights for " caution," and have yellow arms. Several of the new stop-signal arms are of the new uncorrugated steel type.

The " Public Relations " Department.

THE lecture given by Mr. J. B. Elliot, Assistant to the General Manager of the Southern Railway for Public Relations and Advertising, to graduates and students of the Institute of Transport, on Tuesday, December 20, in conjunction with the two addenda contributed by Mr. W. Gott, Commercial Advertising Officer to the associated " Underground " companies, and Mr. W. H. Fraser, Publicity Agent, Superintendent of the Line's Department, Great Western Railway, was notable, first, because it explained very clearly the functions which a " Public Relations Officer " can fulfil in the case of a busy railway, and secondly, by reason of the useful " publicity " hints and suggestions put forward. An important point was that the press and the public generally can, if given adequate explanations, become friends and coadjutors with the railway company, while a railway Information Bureau not only assists the press, but also enables correct and fuller information to be issued instead of more or less irresponsible particulars picked up from whatever source offers. Another issue was that the dissemination of information as to projects in hand, and explanations of why this or that is being done, tend to create confidence in financial circles and to develop a spirit of co-partnership between the railway and the public. Mr. Elliot also explained very clearly the way in which his department dovetailed with others, and generally reviewed the organisation, while he further analysed the reasons justifying the establishment and development of an entirely separate section devoted to public relations work and advertising. In connection with salesmanship, Mr. Elliot expressed the view that the first essential for any efficient selling organisation was that it should be under the control of one man who had direct access to the head of the concern.

Twentieth Century Changes on the G.W.R.

A MEMBER of a party of excursionists from Bath and Bristol who visited the Great Western locomotive works at Swindon on November 16, had not made a tour of this establishment since 1896. He writes as follows :—" The changes in locomotive design which have taken place in the intervening period have been truly revolutionary. Only a few domed engines were to be seen, and these were, of course, of older types, with the exception of the 2-8-0 locomotives of the R.O.D. (Great Central) type. The latter engines, by the way, are numbered in the ' 3000 ' series allotted 30 years ago to the famous 7 ft. 8 in. singles of the late Mr. William Dean's design. Now, of course, the ' single ' locomotive is extinct on the G.W.R. At the earlier period, the latest type of Great Western passenger locomotive was the 4-4-0 *Duke of Cornwall* class. All new locomotives had domed boilers, and inside cylinders were the standard. To-day a complete reversal of practice has taken place —except in the case of the 0-6-2T locomotives for the South Wales lines, which were introduced in 1925. A number of the older locomotives from the absorbed Welsh lines were noticed in the sidings awaiting repairs."

Ryde Pier Tramway.

IN view of the fact that the electric tramcars on this line are being replaced by Drewry rail-cars, the following notes sent by Mr. O. J. Morris will be of interest :—

The Ryde Pier Railway, from the Northern end of St. John's Road station (I.W.R.) to the Pier Head, was constructed by the L.S.W. and L.B. & S.C. Railways to enable

* Down trains from the goods yard only.

Digitized by Google

the trains of the island companies, which formerly terminated at St. John's Road, to be in direct communication with the boats to Portsmouth. This line has a length of 1 mile 18 chains, was authorised July 23, 1877, and opened July 12, 1880. Prior to this date passengers from and to stations in the island were carried between the St. John's Road Terminus and the Pier Head for the boats by a horse tramway. This tramway was owned and run by the Pier Company, and, on the completion of the joint railway extension, was removed between the Esplanade station and the old terminus. The electric tramway, now undergoing replacement by Drewry petrol cars, is the remaining portion of the old horse tramway along the Pier.

At the Esplanade the tramway had a station, since extended to the present dimensions. The line of the old platform and roof is plainly visible, and from it the course of the tramway out of the station into the street may be fairly well traced. The trailer car—shown in the photograph reproduced as still on the rails—is the original horse car. Built in the town about 1868, this car has been, successivly, a horse-car, a trailer when steam working was employed before electrification, and a trailer to the electric motor-car shown undergoing removal in the picture. It is rumoured that this car is to form a trailer to the new petrol cars when the latter commence regular working.

On account of the great cost of the extension, included in which, in addition to the Pier, was the tunnel beneath the town, Parliament sanctioned special fares for the distance. The fare for the run from Pier Head to Esplanade by train was 7d., and from Explanade to St. John's Road also 7d., these fares ranking as the dearest in the world. These charges continued in operation until the formation of the S.R., when a uniform fare of 2½d. was instituted for the whole distance, the fare from Pier Head to the Esplanade being, either by train or by tramway, 1½d.

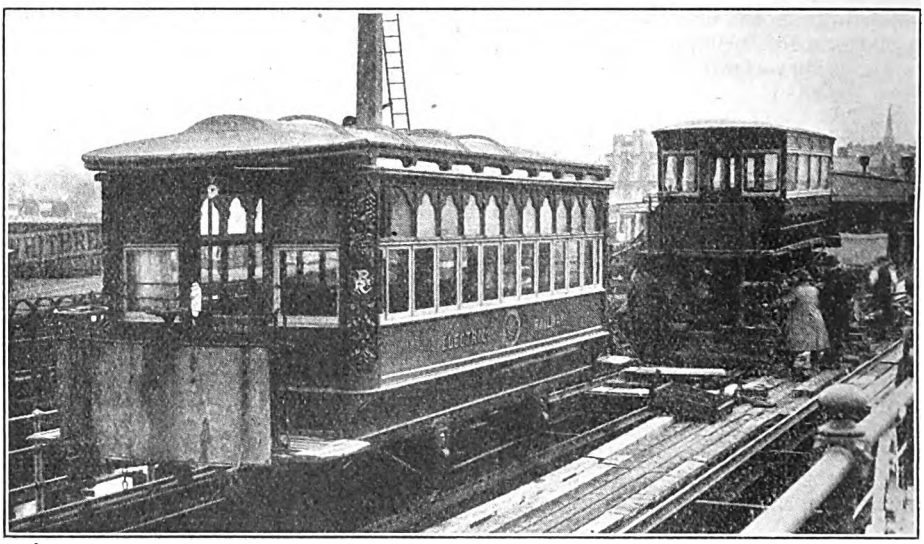


Photo.] RYDE PIER TRAMCARS. [*O. J. Morris.*

A Notable N.E.R. Run.

Mr. R. A. H. Weight writes as follows:—

"On a recent Sunday, the morning London and North Eastern express from Newcastle, York, Hull, &c., conveyed an unusually heavy load, even for the East Coast route in summer. From York, the load was 456 tons tare, or 480 gross, but from Selby it was no less than 579 tons net, or 610 tons gross; there being 17 bogies, including restaurant cars, and six carriage and scenery trucks, with a heavy complement of passengers, baggage and theatrical properties. The locomotive 4-6-2 4474 *Victor Wild* kept exact time to Doncaster. At Doncaster, considerable delay occurred in remarshalling and "drawing up" this tremendous train. Upon starting for King's Cross, the engine was 4480, the rebuilt *Pacific*, with high-pressure boiler, driven by Tomblin, of Doncaster, and hauling 540 tons tare, or 570 tons gross weight. Engine and load remained unchanged on to London.

Digitized by Google

"Between Doncaster and Peterborough, *Enterprise* made up seven minutes of lost time, while from Peterborough to Finsbury Park, no less than a further eight minutes were won back, the average speed over the 74 miles start-to-stop, between the two last-named points being 53 m.p.h. Comparatively speaking, the schedule of the train in question is fairly liberal, but it presents no light task with a load of 570 tons, and that Driver Tomblin, with his aptly-named and interesting "giant" should have made up so much lost time was distinctly creditable."

Locomotive Engines in Poetry.

OUR attention has been directed to the issue of *Punch* dated November 23 last, containing an item which one reader, "Galteemore," has gone so far as to copy out in full for our benefit. Under the general heading of "Engines," described as "For the Young of All Ages," a contributor supplied to our contemporary a poem in which names borne by locomotive engines are freely used. The second verse is, perhaps, the most striking example of the method adopted, and, with due acknowledgments to *Punch*, we quote it as follows :—

I sing *Pendennis Castle, Cleeve Abbey, Shooting Star,*
Knight of the Garter, Tawstock Court—God speed them fast and far!
Prince George and *Queen Elizabeth*, stout *Saint Bartholomew,*
King Arthur and *Sir Lancelot, Sir Galahad, Sir Hugh.*

The author seems to have planned his poem in such a form that alternate verses do or do not utilise the names of locomotives. Thus, the second, fourth, sixth and eighth verses include a number of locomotive names, whereas the first, third, fifth and seventh are descriptive, in each case leading up to the verses which follow. Verse 2 has already been quoted ; in Verse 4 the engine names are *Sansovino, Persimmon, Minoru, Royal Scot, Earl Haig, Talisman,* and *Sir Gilbert Claughton ;* in Verse 6 we find *Borderer, Waverley, Dunedin, Holyrood, Bonnie Dundee, Thane of Fife, Rob Roy, Guy Mannering,* and *Claverhouse ;* and in Verse 8, *Clan Mackensie, Clan Chattan, Clan Munro, Dunrobin Castle, Loch Moy, Strath Dearn* and *Ben y Gloe.* Altogether a clever production, upon which the author is to be congratulated.

Old L.N.W.R. Locomotives.

COMMENTING upon a recent reference to an old L.N.W. section (L.M.S.R.) engine bearing a plate dated 1864, Mr. W. Beckerlegge points out, quite rightly, that in the case of many of these old L.N.W. locomotives the dates thus given are somewhat misleading, though most students of locomotive history are aware thereof. As Mr. Beckerlegge points out, L.N.W.R. engine *Bee* was built in July, 1864, and was one of Mr. Ramsbottom's "curved link" 6-ft. passenger engines, generally known as the "Samson" class, of which 50 were built between May, 1863, and January, 1866. Eight of the first batch of ten had cylinders 15¼ in. in diameter, but the other 42 "Samsons" were built new with 16 in. cylinders. All had 20 in. stroke, 6 ft. coupled wheels, raised running plate coupling-road bushes and splashers with radial openings (as still fitted to the well-known *Cornwall*). The working pressure was 120 lb. per sq. in. Standard Ramsbottom smokeboxes—with doors hinged horizontally below the front handrail—and ornamental chimneys were fitted. *Bee* was withdrawn in the summer of 1890. In 1889 Mr. Webb introduced a new class of 6 ft. 2–4–0 passenger engine, known as the "Straight Link" or "Waterloo" class. The fourteenth of this class received number and name, 642 *Bee*, replacing the engine previously described ; the Crewe Works number is 3125, date August, 1890. The name-plates and number-plates of the old *Bee* were transferred to the new engine, and the date of the new engine was stamped on in small characters as a *rebuilt date* (hence the confusion experienced by Mr. Woodnutt and others). The "Waterloo" class had Allan's straight link motion and different boilers, cylinders, and frames from the "Samsons." The principal dimensions are :

Cylinders ..	17 in. × 24 in.
Heating surface .	1,083·5 sq. ft.
Grate area ..	17·1 sq. ft.
Pressure.. ..	150 lb. per sq. in.
Weight in working order ..	35 tons 12 cwt.

Soon after the L.M.S.R. group was formed, the numbers 5080 to 5109 were allotted to the remaining "Waterloo" class, but several were withdrawn before carrying the new numbers. Under this scheme *Bee* will become 5084 and is the second oldest in service, *Henrietta* (5083) being some seven months older.

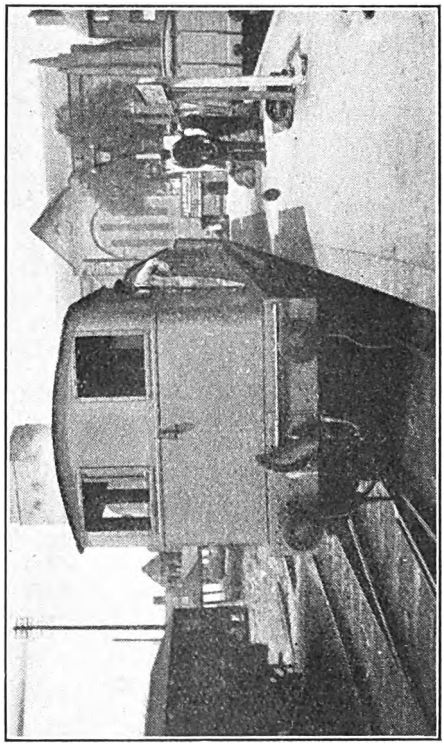
Shropshire and Montgomeryshire Light Railway.

MR. R. LYLE, writing from Hereford, sends some notes in regard to locomotives and train working on this line. Visiting Kinnerley at the end of August, he travelled from Shrewsbury by a Duplex Ford motor train. At

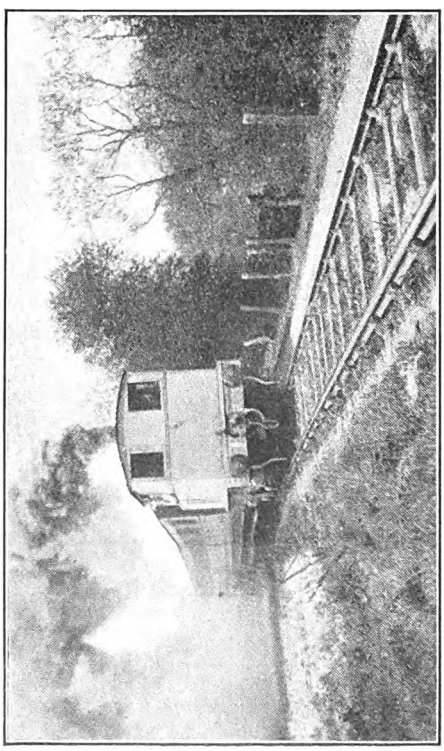
Digitized by Google

SHROPSHIRE AND MONTGOMERYSHIRE LIGHT RAILWAY.

Views showing a "Super-Sentinel" locomotive working a local passenger service.



View taken in Shrewsbury (Abbey) Station. [*J. J. Miller.*



Photos.] Train Ascending 1 in 40 Gradient after Leaving Shrewsbury (Abbey) Station.

Kinnerley he noted some four-wheeled open goods wagons lettered K. and E. S. Railway, presumably transferred from the Kent and East Sussex line. On arriving at the shed, the following locomotives were seen :—

0-6-0 "Ilfracombe Goods," ex L.S.W.R. Now No. 4, *Thisbe*, S. & M. Railway.

0-6-0 "Ilfracombe Goods," ex L.S.W.R. Now No. 3, *Hesperus*, S. & M. Railway.

0-6-0 "Ilfracombe Goods," ex L.S.W.R. Now No. 6, *Pyramus*, S. & M. Railway.

0-6-0 Side Tank "Terrier," ex L.B.S.C.R. Now No. 7, *Hecate*, S. & M. Railway.

0-6-0 Side Tank "Terrier," ex L.B.S.C.R. Now No. 8, *Dido*.

0-6-0 Side Tank "Terrier," ex L.B.S.C.R. Now No. 9, *Daphne*, S. & M. Railway.

0-4-2 Saddle Tank. Now No. 2, *Severn*, S. & M. Railway.

0-4-2 Engine. *Gazelle*, S. & M. Railway.

The locomotive *Severn* is the oldest locomotive running in England. It is believed to have been built about 1840, by the firm of either Bury or England, as an 0-4-0 tender engine for the Shrewsbury and Hereford Railway. The locomotive, which was purchased in 1911, and put to work on the S. and M. Railway, was formerly named *Hecate*, but now bears the nameplates *Severn* on the saddle tank. Among the interesting points connected with the engine are :—A bar frame fitted instead of a plate frame ; the unusual type of coupling rods ; the cylinders, underneath the leading axle, which are only 6 in. off the ground, and the connecting rods, which work upwards instead of downwards in the usual way.

Out-of-Gauge Load Conveyance by L.N.E.R. from Sheffield to Sunderland.

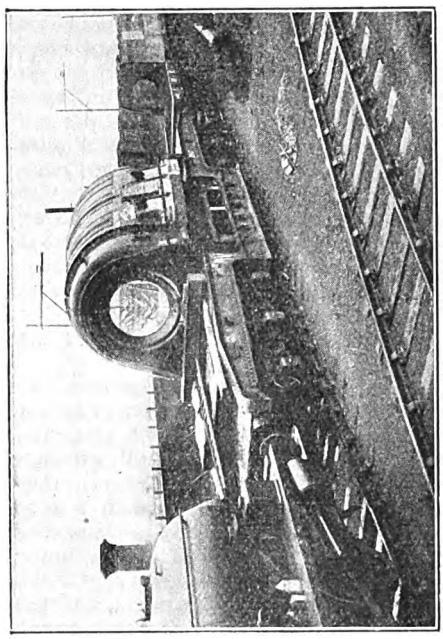
A PHOTOGRAPH is reproduced on the next page, showing a large casting which the L.N.E.R. recently conveyed from Sheffield to Sunderland.

The measurements of the plate are :—21 ft. 7½ in. long, 14 ft. 7 in. wide, 5 ft. 6 in. deep, and weight, 30 tons. Owing to the excessive dimensions, rail conveyance could

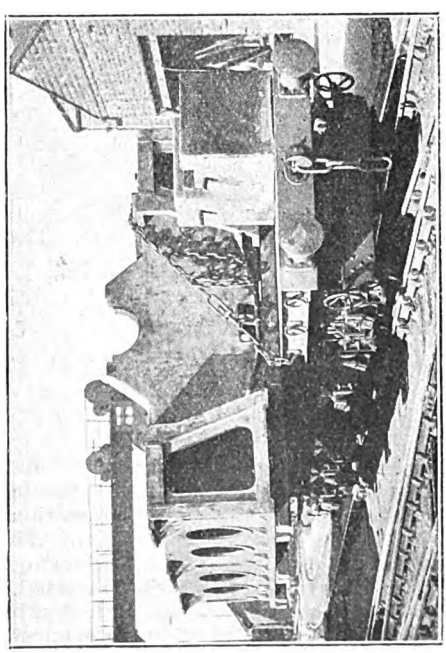
Digitized by Google

not be arranged from the Openshaw (Manchester) Works of Sir W. G. Armstrong, Whitworth & Co. Ltd., Manchester, through Woodhead Tunnel, and to obviate this, road conveyance was arranged from Manchester to Sheffield, at which point the casting was railed.

It was loaded on a L.N.E.R. 60-ton six-wheeled bogie flat wagon out of centre to the 6-ft. side, and the following figures were produced when loaded :—4 ft. 11 in. wide from the centre to the platform side and 9 ft. 8 in. wide from the centre to the 6-ft. side, therefore equalling, in widths, loads of 9 ft. 10 in. wide to the platform side and 19 ft. 4 in. wide to the 6-ft. side. The traffic was worked by special train on a Sunday from Sheffield to Sunderland, with the opposite line clear of all other traffic. Balance weights were used on the truck, having regard to the excessive overhang on the 6-ft. side, and 20 tons were required to accomplish this.



80-TON STATOR CONVEYED BY C.L.C. FROM MANCHESTER TO BIRKENHEAD. [*Topical.*



TRANSPORT OF OUT-OF-GAUGE CASTING FROM SHEFFIELD TO SUNDERLAND, L.N.E.R. *Photos.*]

Free Steaming Locomotives.

Not only certain classes of locomotives, but individual units of a given and numerous class often achieve a desirable reputation for free steaming, which, in other words, means that not only is a sufficiency of steam available for all conditions of running, but that the most is made of a given quantity of steam. Contributory to this satisfactory state of affairs are: (1) a good boiler in proper condition; (2) favourable valve events, and (3) correct and liberal proportions for the steam inlet and exhaust arrangements.

In the past, relatively small and under-powered locomotives have proved capable of performing extraordinarily good work, even when overburdened with heavy loads, for no other reason than that they possessed free steaming qualities and the ability quickly to exhaust the steam after its work had been done in the cylinders. Noteworthy in this connection was the "Precedent" class of engine designed by the late F. W. Webb and built at Crewe from the year 1874 onward.

In these engines the cylinders were horizontal, but the port faces were inclined laterally and also longitudinally to suit the inclination of the valve spindles, an arrangement which allowed plenty of space in the steam chests. The area of each of the steam ports—21 sq. in.—was 0·0925 of the piston area, and the opinion has been authoritatively expressed that the excellent speed which these engines frequently attained was probably due to the ease with which the exhaust steam left the cylinders.

Digitized by Google

Improved Great Western Railway Freight Services.

THE Great Western railway has for some time past been accelerating and improving in many directions its freight train services, and a further indication of this policy of speeding up is evidenced in the running as from December 5 of new express partially fitted vacuum freight train from Paddington, leaving at 9.10 p.m. for Shrewsbury, Chester and Birkenhead, with connections for the principal stations in North Wales. The new train is scheduled to arrive Shrewsbury at 2.13 a.m., Chester at 4.19 a.m. and Birkenhead at 5.45 a.m., a considerable improvement on the arrivals formerly given, which were Shrewsbury 3.45 a.m., Chester 6.49 a.m., and Birkenhead 8 a.m.

A notable feature of the new service is the fact that the train is scheduled to run non-stop from Greenford, from which place it is due to depart at 10.30 p.m., to Shrewsbury, a distance of 145¼ miles. Between these points the journey is performed in 3 hours 43 minutes, or at an average speed of 39·08 miles per hour. This is the longest distance run without stopping by any freight train on the Great Western system, and probably is one of the longest non-stop freight train runs in the British Isles. Great Western stock, the high standard of which is well known, is used exclusively on the train.

The train is worked by a 4-6-0 main-line locomotive as far as Shrewsbury, and leaving Greenford at 10.30 p.m., is booked to pass Birmingham (Snow Hill) at 12.59 a.m., Wolverhampton (Low Level) at 1.21 a.m., and to reach Shrewsbury at 2.13 a.m. The journey is continued at 2.50 a.m., and Birkenhead goods station is reached at 5.45 a.m. On Saturday nights the schedule is slightly altered, Greenford being left at 10.15 p.m. and Shrewsbury reached at 2.22 a.m. The make-up includes vacuum-fitted vehicles for Birkenhead, Chester, Warrington, C.L.C. line *via* Helsby, Wrexham, Ruabon, Gobowen and Shrewsbury, a total of 40 wagons being scheduled from Greenford to Shrewsbury.

Chaired *v.* Flat-Bottomed Track.

THE majority of the railways of the world are laid with F.B. rails, Great Britain standing out almost alone in its retention of the chaired road. In the case of the British Empire there are thousands of miles of line in Australia, New Zealand, the United States, Canada and South America where the tracks are almost exclusively laid with F.B. rails, and, so far at least as the main lines are concerned, travellers have been impressed by the excellence of the running thereon. It is, therefore, of interest to note that the Central Argentine Railway, on its Buenos Aires electrified suburban lines, is relaying with 100-lb. section chaired rails in substitution for the old 85-lb. section F.B. rails, while in Brazil the San Paulo Railway is changing the 90-lb. chaired track in favour of 100-lb. F.B. track. On some lines exceptionally heavy axle loads are carried on F.B. tracks, though it must be conceded that, with the various fastenings employed, such track approaches the strength of similar section-chaired road. Proposals have been made from time to time with regard to the adoption of F.B. track in this country, and we understand that the Great Western Railway is arranging for the laying in of a trial length of such track. An experimental length of F.B. track on a suitable route will certainly be useful as a means of investigating the question of relative strength, and of ascertaining the difference in the maintenance requirements of chaired and F.B. track under British conditions.

"Royal Scot" Locomotive Working.

AN interesting and comprehensive paper was read by Mr. Lawford H. Fry, of the Baldwin Locomotive Works, U.S.A., before a meeting of members of the Institutions of Mechanical and Locomotive Engineers in London on Friday, December 16. A detailed study was presented of some phases of the cylinder action of a three-cylinder compound locomotive, using a boiler pressure of 350 lb. per sq. in. This locomotive, No. 60,000, was built as an experiment by the Baldwin Locomotive Works in 1926, and after being subjected to a series of very thorough tests on the Pennsylvania Railroad locomotive testing plant at Altoona, has been tried out in actual service on a number of important railways in the United States with very satisfactory results.

In the subsequent discussion Sir Henry Fowler, Chief Mechanical Engineer, L.M.S.R., gave some interesting particulars of locomotive tests carried out by him. He said that a short time ago the question of providing a much larger type of locomotive on the L.M.S.R. had had to be considered, although, of course, a very much smaller one than the interesting locomotive described in the paper. Had it been possible, they would like to have built a three-cylinder compound on the lines of those which have given, and are giving, such good service. Taking into account all the conditions to be met with, it was decided to build a three-cylinder simple engine with a boiler pressure which at that time was not being employed in this country, viz., 250 lb. per

Digitized by Google

sq. in. A great deal of attention was particularly directed to the boiler proportions, which were finally settled largely on previous experience with an existing type on the L.M.S.R., bearing also in mind others' experience and Mr. Fry's very valuable work in this direction. Although this engine had not yet been indicated, they had for a number of weeks past been making tests with a dynamometer car attached to various trains worked by the "Royal Scot" class of locomotive, and the results were so striking and consistent that he thought it might be of interest to give these figures, as showing what is being done in this country with a simple type of locomotive. Figures obtained with the standard three-cylinder compound on the same road were also given.

Need for a Locomotive Testing Plant.

UNFORTUNATELY, there is not at present in this country a locomotive testing plant similar to the one on the Pennsylvania Railroad at Altoona, although the matter had been under consideration for some time, and Mr. Gresley, in his Presidential Address to the Institution of Locomotive Engineers a short time ago, put forward a proposal on this subject.

An interesting set of tables was given. These were obtained from dynamometer car tests; they gave the coal and water consumption on a unit which is the drawbar horse-power hour. With the same locomotive this would vary somewhat with the weight of the train behind the drawbar, all other things being equal.

Sir Henry Fowler further remarked it was difficult to make a comparison, and although he would be the last to say that better results might not have been obtained with a compound locomotive at considerably higher boiler pressures, he would call attention to the fact that the consumption of coal and water per drawbar horse-power hour was down to 2·66 lb. of coal and 22·3 lb. of water on the test between Crewe and Euston with the heaviest train tried. The only comparison he knew of with the locomotive described in the paper was from a publication by the Baldwin Locomotive Company, where the coal rate per drawbar horse-power hour is given as approximately 2½ lb. at the middle of the working range. In the paper the figure for indicated horse-power hour is shown as 2·6 lb., while the water consumption is much lower. In all these cases the question of coal consumed is of great importance. In the L.M.S.R. trials, as far as possible, the coal used was kept uniform. Its calorific value is about 14,050 B.Th.U.

Old Timber Viaducts in Cornwall.

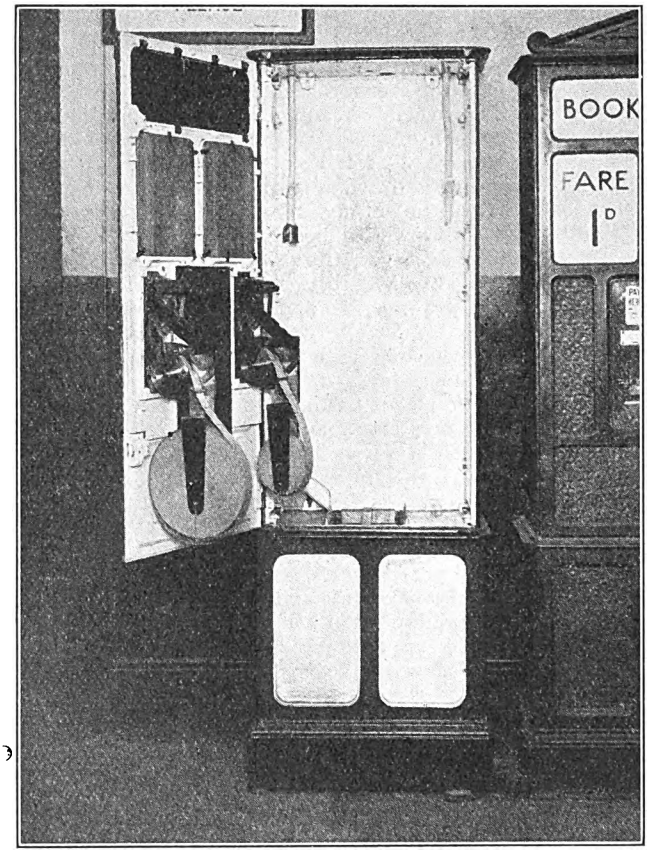
"MENEAGE," writing from Falmouth, and sending two photographs (not reproduced) showing the work of replacing the old wooden Penwithers Viaduct, on the Falmouth branch of the G.W.R., by an embankment, remarks as follows: "This is situated near Truro and a few yards beyond the junction with the main line. The stone piers and woodwork had been covered, up to a level slightly below the original track, and traffic was diverted to a new line of rails laid on the top of the embankment alongside, at this level. Afterwards the woodwork was removed. This is the fourth of the eight wooden viaducts lately remaining on the branch to be replaced, three by embankments and one by a stone viaduct. Carnon Viaduct, of which a view appeared in the RAILWAY MAGAZINE for September, 1925, is one which still remains." "Meneage" adds the further comment, in regard to Fowey traffic: "This is now worked almost entirely *via* Lostwithiel. At Par, the name-board used to add 'Junction for Fowey and Newquay.' With the reorganisation of the Fowey traffic, the word 'Fowey' was at first merely blacked over, but now the lettering has been rearranged and that name has entirely disappeared."

Liverpool Street Suburban Services, L.N.E.R.

TRAVELLERS on the suburban lines of the London and North Eastern Railway served by Liverpool Street will see three posters of a novel kind. One shows that while 120,000 people arrive daily at Liverpool Street, 85,000, or 70·83 per cent. of them, arrive between 7.0 and 10.0 o'clock in the morning—this is 21,000 more than travelled between these hours in 1913. In this connection it is pointed out that the ordinary City worker is employed under much better conditions, with shorter hours, than he enjoyed in pre-war days. "This is not an excuse for any discomfort which is experienced on the journey to and from the City, but it is reasonable that travellers should bear in mind that they are crowding together at peak periods and setting the railway company in a very congested area a problem that is difficult to solve."

Another poster shows that the Great Eastern Railway in 1913 was able to run 86 per cent. of its suburban services to arrive not more than two minutes late. This was undoubtedly a great achievement, of which the present company has been reminded by many regular users of the line. Figures were taken out last year for an identical period, and it was discovered that during the same hours 87 per cent. of the suburban

Digitized by Google



"UNDERGROUND" AUTOMATIC TICKET MACHINE.

trains were not more than two minutes late, although there was an increase in the service amounting to 23 per cent. more trains.

There is one other poster which explains to the public that in spite of the extraordinarily difficult times the railway company has experienced, owing to trade depression, road motor competition and other causes, since the year 1923, when the London & North Eastern Railway was formed, works involving an expenditure of £1,250,000 have been undertaken on the Great Eastern section alone. The object of this poster is stated to be to help the public who use Liverpool Street station to appreciate facts concerning their daily transport by rail, and the company that carries them. "If simple business facts are appreciated by these people, it will create between carriers and carried a co-operation which is mutually to be desired."

New Ticket-Issuing Machines on the District Railway.

An experimental automatic ticket-issuing machine has been installed at St. James's Park station. It works on the same principle as the Post Office stamp-issuing machines, requiring no electrical power to operate it, the action of inserting the coins being sufficient to set the machinery in motion. At present there is one machine containing mechanism inside for the issue of penny and twopenny tickets. But should it prove a success, it is hoped to install other machines at various stations over the system in the near future.

The tickets are in rolls of 5,000, and the continual restocking of the machine, as in the case of the older types of slot ticket machines, is unnecessary.

A new type of self-printing, ticket-issuing machine has also been installed at Victoria station. It is for twopenny tickets only, and, upon the insertion of two pennies, a printed, dated, numbered ticket is delivered to the passenger, the whole operation taking only two seconds. The magazine inside the machine contains sufficient material for the issue of 2,000 tickets. As in the case of the machine at St. James's Park, this latter machine is at present only an experiment.

An Unusual Southern Railway Working on the G.W.R.

Referring to a reply given in "The Why and the Wherefore" section, Mr. E. J. Norris and Mr. G. F. Raynor write giving particulars which seem to be of general interest, and which explain the apparent anomaly which promoted the query. Mr. Norris gives details as follow: "There is now a regular Southern turn to Maidenhead:—

10.30 a.m. (approx.) Eastleigh to Reading, arr. 11.55.
2.25 p.m. Reading to Maidenhead.
3.12 p.m. Maidenhead to Reading.
4.52 p.m. Reading to Eastleigh.

It is usually taken by Drummond 0-4-4 tank engine No. 111, of Eastleigh Shed."

Mr. Raynor suggests that the working is apparently made by a Southern Railway engine stationed at Reading—No. 111 being generally employed—to counterbalance the working of Southern Railway trains by G.W.R. engines to Basingstoke. He mentions further that recently he saw the engine coupled to a G.W.R. 0-6-0 pannier tank engine and a "Duke" class 4-4-0.

Digitized by Google

National Railway Museums.

A LETTER published in the pages of our American contemporary, the *Railway Age*, suggested by the recent "Fair of the Iron Horse," organised by the Baltimore & Ohio Railroad as part of its Centenary Celebrations, advocates the formation of a permanent railway museum. This applies, of course, to United States railways, though we believe there is already a nucleus in the Field Museum in Chicago, while several American railways have preserved old locomotives, rolling-stock and other material in their workshops, or placed for public inspection on station or other premises. Reference is made to railway collections in Germany and Austria, some of which are, we understand, relatively complete. The writer does not mention, however, the British railway exhibits in South Kensington Museum, nor the growing collection which the L.N.E.R. accommodates at York. It will be recalled that some 20 years or so ago there was an extensive newspaper correspondence advocating that there should be a definite Railway Museum in this country. That there is abundant material therefor is beyond question. All the railways have a certain amount of material of an historic character at their headquarters, and most of them have some actual relics of permanent-way and early signals, if not of locomotives and rolling-stock. There are also engines in service which might fittingly be preserved instead of going to the scrap heap, while not a few private individuals have collected much material of historic interest. We understand that it is hoped eventually to devote considerable further space to the railway collections at South Kensington, and we may yet see, with the co-operation of the railway companies, this developed into a comprehensive railway section. It is interesting, however, to find the same idea mooted in regard to American railways.

Old "Beattie" 2-4-4 Tank Engines.

A BATH correspondent writes :—"The illustration on page 452 of the December RAILWAY MAGAZINE of the old Beattie 2-4-0 tank engine was of particular interest to me personally as I remember seeing one of these engines, No. 0261, in the late 'nineties, working a 'shuttle service' between Fratton and Southsea. I believe this particular service did not survive the war. Even at that period, over 30 years ago, this engine, it will be noted, like practically all the Beattie locomotives still in service, was on the duplicate list. She was painted black, and retained the characteristic tall dome with spring balance safety valves over the firebox, but had the Adams' stove-pipe chimney. Apparently the Fratton and Southsea service was worked at that period by locomotives of L. & S.W.R. and L.B. and S.C.R. alternately. I recollect seeing two of the latter company's 'Terrier' class of Stroudley 0-6-0 tank engines—No. 51, *Rotherhithe*, and No. 75, *Blackwall*—on the same service."

Railway Steamers.

MR. C. J. COGHLAN sends the following notes in regard to railway steamers on Irish services :—

The L.M.S.R. withdrew the R.M.S. *Anglia* from the Kingstown and Holyhead mail-boat service in 1925. The *Anglia* was the first of the four steamers specially built for the Kingstown and Holyhead mail service in 1920, and cost £480,000. The old L.N.W. Dublin–Holyhead packet *Hibernia*, renamed *Tara* when taken over by the Admiralty for war service, was captured on November 5, 1915, off the North African coast, near Port Suliman, a German submarine base, by a U-boat, which sank the vessel and took her crew prisoners. These fell into the hands of the Turks, who handed them over to the Senussi Arabs. After enduring months of harsh captivity, the Tara's crew were rescued by an armoured car expedition led by the Duke of Westminster. The sister ship of the *Hibernia*, the *Anglia*, was taken over as a hospital ship, and when H.M. the King was injured in the spring of 1915 in France, while on a visit to the front, by a fall from his horse, he crossed to England in the *Anglia*. The *Anglia* was mined in the Channel on November 17, 1915, with a loss of 80 lives.

The two other vessels, sister ships of the above, *Scotia* and *Cambria*, were renamed *Arvonia* and *Menevia* when the four new vessels were built by the L.N.W.R. in 1920. The *Arvonia* and *Menevia* were engaged as transports during the evacuation of the British troops from the Irish Free State in 1922, and in 1923 the Free State used them in similar fashion to send troops to Cork and Kerry during the Civil War; the writer remembers seeing them pass down the coast, about two miles out to sea.

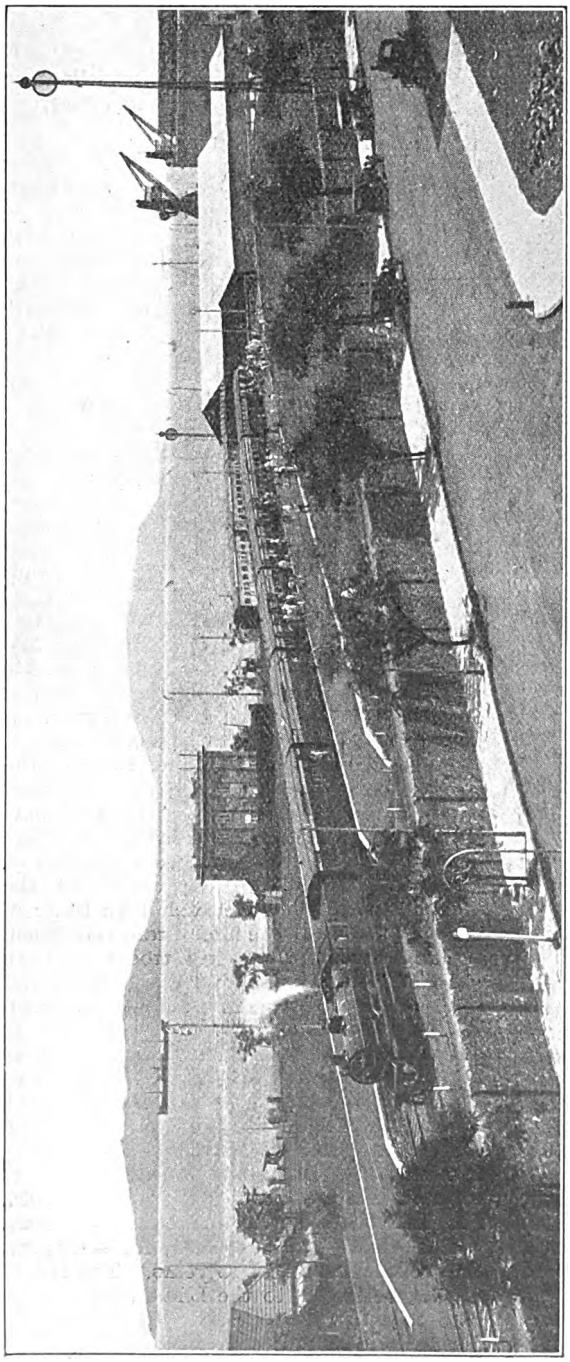
The Lancashire and Yorkshire Railway Company's steamer *Duke of Albany*, was torpedoed while acting as an armed boarding steamer in the North Sea, on August 25, 1916, with a loss of 24 lives. The *Duke of Connaught* ran for a while on the mail service between Holyhead and Kingstown in 1920. The L.M.S. *Greenore* was sold to Messrs. Wards, of Sheffield, in 1925, for scrapping, after a brief career of 13 years. The *City of Belfast*, belonging to the L.M.S., was sold in 1925 to a Greek company. In reference to the Isle of Man Steam Packet Company's

Digitized by Google

Peel Castle, mentioned by Mr. W. A. Hinchcliffe in the October RAILWAY MAGAZINE, it formerly was the *Duke of York*.

Notable Train Running in India.

REFERENCE has already been made to the inauguration of a new P. & O. Punjab express, B.B. & C.I.R., from Bombay to Delhi and Peshawar on October 7 last, and explained that this run inaugurated a new policy in Indian railway history and includes schedules harder than any previously introduced, in that it is booked to cover the distance of 865 miles by the route—the shortest—adopted in 23 hours 35 min., thus being the fastest express train in India. As we are reminded by the Acting General Traffic Manager of the Bombay, Baroda & Central India Railway, to whom we are indebted for the illustrative and other material utilised, this train reaches Delhi 6 hours 40 min. before the G.I.P. Punjab Limited, and reaches Peshawar nearly 10 hours before that train. On its inaugural run on October 7, the train reached Muttra 45 min. before time, thus beating all records on Indian railways. Between Muttra and Delhi—a section worked by the G.I.P. Railway—the train was, by a misunderstanding, detained for 45 min., so that all the time made up between Bombay and Muttra was lost. But in spite of this the driver succeeded in making up another 15 min., so that he reached Delhi 15 min. before time, once again breaking all records.



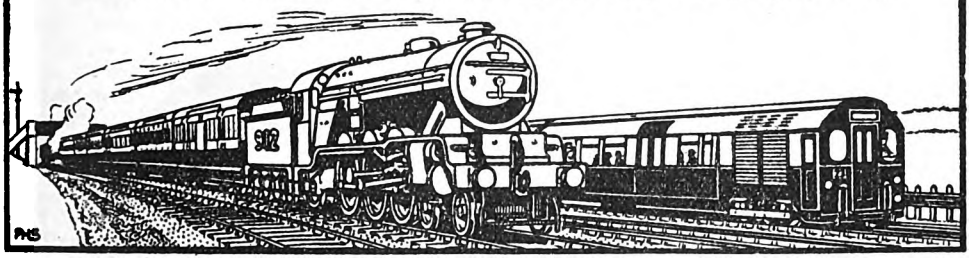
P. & O. PUNJAB EXPRESS LEAVING BOMBAY ON INAUGURAL RUN TO DELHI. OCTOBER 7, 1927.

Owing to the late arrival of the P. & O. mail steamer at Ballard Pier, Bombay, on Friday, December 9, the train was unable to leave the Mole until 17.30, or 4½ hours behind her scheduled time, as the mails could not be loaded earlier, and passed Mahim, the junction with the B.B. & C.I. Railway main line, at 17.59. In order to cause the least possible inconvenience to passengers and to ensure the early delivery of the English mails, the B.B. & C.I. Railway authorities decided to make a special effort to reach Delhi in record time.

As a result, Delhi was reached at 14.30 on Saturday, the 10th, thus accomplishing the run of 854 miles from Mahim to Delhi in 18 hours 28 min., excluding stops aggregating 2 hours 4 min. for water, meals, &c., or at an average speed of 46·2 miles an hour, in spite of speed restrictions and heavy gradients on the way.

Digitized by Google

WHAT THE RAILWAYS ARE DOING.



NEW L.M.S.R. APPOINTMENTS.

THE following appointments have been approved by the Directors of the London Midland & Scottish Railway :—

Chief General Superintendent's Department.

Mr. A. Rogers is appointed District Controller, Edinburgh.

Chief Goods Manager's Department.

Mr. E. H. Davies, Goods Manager, Glasgow, to be Goods Operating Manager, Euston, in succession to Mr. W. A. Ree.

Mr. T. E. Argile, District Goods Manager, Liverpool, to succeed Mr. Davies as Goods Manager, Northern Division, Glasgow.

Mr. F. R. Hauxwell, of Bolton, to be District Goods Manager, Liverpool.

Mr. G. O. Humphreys is appointed District Goods Manager, Bolton.

Mr. T. Evans becomes Assistant District Goods Manager, Leeds.

Mr. H. Tandy is appointed Assistant to District Goods Manager, Manchester.

Mr. H. W. Ede is appointed District Goods Manager, Northampton, vice E. H. Hackwood, retired.

Mr. D. S. Inman is appointed Assistant District Goods Manager, Leicester, vice Mr. R. G. Head, retired.

Chief Engineer's Department.

Mr. E. H. Townshend, Divisional Engineer, Lancaster, to be Divisional Engineer, Northern Division, Manchester.

Mr. W. E. Thornhill, District Engineer, Bangor, to be Divisional Engineer, Western Division, Crewe.

CONSEQUENT on the retirement of Mr. F. C. Stainton, New Works Engineer, Southern Railway, the following appointments are announced, effective from January 1, 1928 :—

Mr. Conrad Gribble, Bridge Assistant to the Chief Engineer, to be Assistant Engineer (New Works and Bridges).

Mr. S. G. Morgan to be First Engineering Assistant (Bridges).

Mr. G. F. Barber to be First Engineering Assistant (New Works).

* * *

Elliott] [*& Fry.*

MR. W. M. TEASDALE,

Appointed Assistant General Manager (Parliamentary) and Industrial Agent, L.N.E.R.

MR. W. M. TEASDALE, who has been appointed Assistant General Manager (Parliamentary) and Industrial Agent, London and North Eastern Railway, had held the position of that company's Advertising Manager since its formation in 1923. Previously to that date, and after occupying various posts in the Traffic Departments of the North Eastern Railway, he had been N.E.R. Advertising Manager since December, 1920. Since 1923, Mr. Teasdale has been responsible for: (1) The compilation and issue of all L.N.E.R. advertisements; (2) all advertising expenditure; (3) the appearance of the company's property so far as advertisements are concerned; (4) all commercial advertisements and revenue derived therefrom. Mr. Teasdale has built up a large organisation, equipped to meet his company's needs, and under his control, L.N.E.R. publicity, of whatever kind, has assumed a distinction which has won recognition from many quarters. Newspaper advertisements of a compelling nature, pictorial posters designed by those eminent

Digitized by Google

SIR JOHN NICHOLSON, C.M.G.,
Chief Engineer for Docks L.N.E.R., 1923-27.

MR. J. A. WICKHAM, C.B.E.,
Appointed Chief Engineer for Docks, L.N.E.R.

MR. H ALLAWAY,
Appointed Assistant General Manager (Shipping), L.N.E.R.

MR. C. G. G. DANDRIDGE,
Appointed Advertising Manager, L.N.E.R.

Digitized by Google

in the world of commercial art, letterpress bills of distinctive types, booklets with exteriors and interiors of arresting character and various other media, all bearing the stamp of careful thought and preparation for their mission of winning public sympathy and attracting business—all these are outward and visible signs of Mr. Teasdale's successful administration. The Press Section, which Mr. Teasdale instituted in 1924 as a means of furnishing the press with prompt information regarding L.N.E.R. activities, will continue to be under his direct control.

* * *

SIR JOHN NICHOLSON, C.M.G., who retired at the end of the year from the office of Chief Engineer for Docks, L.N.E.R., which he had held since 1923, was appointed to a corresponding position under the North Eastern Railway in 1920. He started with the firm of Black, Hawthorn and Co., locomotive and marine engine builders, Gateshead-on-Tyne, with whom he served from 1883 to 1888. From 1888 to 1889 he was in charge of the erection of buildings and plant at Pandon Dene, the first power station of the Newcastle-on-Tyne Electric Supply Company. In 1889 he became Assistant Engineer, Quebrada Railway and Copper Mines, Venezuela, and in 1891 was made Chief Mechanical Engineer of this undertaking and the South Western Railway of Venezuela. From 1895 to 1899 Sir John was with P. W. and C. S. Meik, consulting dock and railway engineers, Westminster, and during that period designed the locomotives and rolling-stock and other plant for the Port Talbot Railway and Docks; he was also Resident Engineer of the graving dock at Port Talbot, and other sections of the undertaking. From 1899 to 1902 he was Chief Engineer of the Bridgewater Trust, and in the latter year was appointed Managing Director and Chief Engineer of the Tanjong Pagar Dock Company, Singapore. On the acquisition of that company's property in 1904 by the Government, he was appointed Chairman and Chief Engineer of the Singapore Harbour Board, and also of the Penang Harbour Board. Under his régime the lay-out of the wharves was entirely remodelled, and the main wharves reconstructed in concrete, providing a greater depth of water alongside and improved cargo-handling facilities. The new Empire Dock was built, the graving docks enlarged, and a new graving dock (the King's Dock) built, this dock at the time of its completion being large enough to take any ship then afloat. Sir John was created C.M.G. in 1913, on the completion of the King's Dock, Singapore, and Knight Bachelor in 1919, on the completion of the Singapore Dock scheme of reconstruction and extension. At the desire of the directors, Sir John will remain as Consulting Engineer for docks for a period of two years.

* * *

MR. J. A. WICKHAM, C.B.E., M.Inst.C.E., M.I.Mech.E., who has been appointed Chief Engineer for Docks, London and North Eastern Railway, had held the position of Assistant General Manager (Parliamentary), L.N.E.R. (also covering the duties of Industrial Agent), since 1925. He was formerly a partner in the firm of Couper and Wickham, consulting engineers, of Westminster. Educated at Reading School, he received his engineering training at the City and Guilds Central Technical College, obtaining the diploma in civil and mechanical engineering in 1900. Subsequently he was engaged upon the construction of a number of important public works in this country, in the Mediterranean and South America. During the war, Mr. Wickham served with the transportation forces overseas, and held the appointments successively of Chief Engineer, Ports Construction, B.E.F., France; Deputy Director-General of Transportation; and, finally, Director-General of Transportation, British troops in France and Flanders. He acted as the British technical member on the Inter-Allied Commission for the repairs to the Belgian ports, and was demobilised towards the end of 1919 with the rank of Brigadier-General. Since the war, Mr. Wickham has visited and reported on several engineering undertakings abroad, notably in Greece, Spain, Portugal, West Africa and the Congo district of Angola. In 1922 he undertook, on behalf of the Government, the valuation of the military railways, roads, cantonments, &c., in Palestine, and of the Sinai military railway from Kantara to Rafa. Mr. Wickham joined the London and North Eastern Railway Company in June, 1924, as Assistant to the Chief General Manager, King's Cross.

* * *

MR. H. ALLAWAY, who has been appointed Assistant General Manager (Shipping), London and North Eastern Railway, obtained experience in general shipping matters with private firms before entering North Eastern Railway service. On January 1, 1897, he was selected to represent at Hull a Committee of Management of steamers, in which the old North Eastern Railway Company was interested. In 1905 he became Continental Traffic Agent at York. Among special developments during his tenure of office, Mr. Allaway represented the North Eastern Railway Company on the International Union of Railways (the North Eastern Railway was the first British company to become associated therewith), in

Digitized by Google

MR. E. H. DAVIES,
Appointed Goods Operating Manager, Euston, L.M.S.R.

MR. T. E. ARGILE,
Appointed Goods Manager, Northern Division, Glasgow, L.M.S.R.

MR. G. MILLS,
Appointed Assistant to Chief General Manager (Rates and Statistics), L.N.E.R.

Elliott] [& *Fry*.

MR. J. C. L. TRAIN,
Appointed Assistant to Chief General Manager (Works), L.N.E.R.

Digitized by Google

regard to facilities for travel by means of combined coupon tickets to and from practically everywhere in Europe. Mr. Allaway also acted as liaison officer between the North Eastern Company and various shipping companies using north-eastern ports. During the latter years of the war, Mr. Allaway acted as Statistical Assistant to the Director of Movements in connection with vessels allocated to the War Office for the movement of the enormous quantities of ammunition, railway material, and general supplies which were sent across to France for the use of the British Forces. His appointment as Continental Traffic Manager (North), L. and N.E. Railway, dated from January 1, 1924.

* * *

MR. C. G. G. DANDRIDGE, who has been appointed Advertising Manager, London & North Eastern Railway, in succession to Mr. W. M. Teasdale, became London District Passenger Manager early in 1926, prior to which he had held the position of District Passenger Manager, Manchester, as from August 1, 1923. Mr. Dandridge commenced his railway career in 1905 in the General Manager's office of the Great Central Railway. He qualified by competitive examination for the Great Central Railway training scheme, under which he obtained experience in various sections of the operating and commercial departments, and was also for a time on the staff of the Locomotive Running Superintendent, the Stores Superintendent, and the Portmaster. During the war Mr. Dandridge served as a Traffic Officer, and subsequently as D.A.D.R.T. with the British Army in France, while in 1918 he was appointed to take charge of the Traffic Department of the Archangel Northern Railway (Russia), with the rank of Major, R.E. He afterwards served as D.A.D.R.T. with the Railway Mission in South Russia, and there gained experience of the working of the Russian railways under quite abnormal conditions. When the Railway Mission terminated he was appointed District Traffic Superintendent of the Anatolian Railway, Turkey. On his return to England Mr. Dandridge was appointed Assistant District Traffic Manager, Great Central Railway, Manchester, becoming District Passenger Manager at Manchester, L.N.E.R., on August 1, 1923, and London District Passenger Manager early in 1926, as above mentioned.

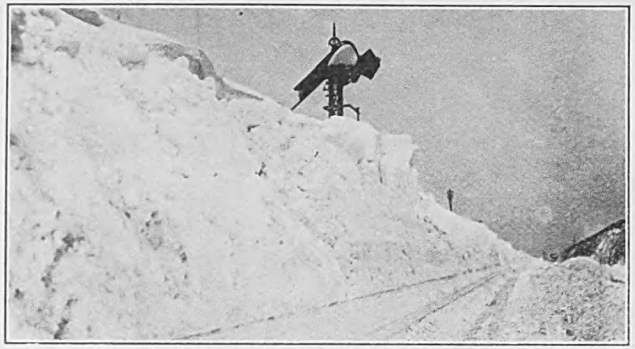
* * *

MR. E. H. DAVIES, who has been appointed Goods Operating Manager, Euston, L.M.S.R., in succession to Mr. W. A. Ree, became Goods Manager, Northern Division, in May, 1927. He entered L.N.W.R. service as an apprentice at Park Lane station, Liverpool, and, after experience in all departments at stations, he was transferred to the District Manager's office, and had experience of re-organising work in all departments. He was then promoted to be Agent, and served in that capacity at most of the large Liverpool stations and at Birkenhead. In January, 1914, he became Assistant Manager, Birmingham District. In March, 1915, he was loaned to the Ministry of Munitions as Railway Transport Officer for the Midlands, being transferred in December, 1915, to the Ministry Headquarters in London, as Assistant Director of the Railway Transport Department. Upon the establishment of the Coal Control he was transferred there, and for services rendered was awarded the O.B.E. On his return to railway service, Mr. Davies became District Goods Manager in the Northampton district, and was transferred thence to Euston in September, 1919, to take charge of a newly-created Road Transport Department. He was promoted to Manchester in 1923, as Station Working and Road Transport Assistant for the reconstituted L. & N.W.R., consisting of the L. & N.W., L. & Y., and a number of the smaller railways. He became Chief of the L.M.S. Road Transport Department in January, 1923, and remained in that position until receiving the appointment of Goods Manager, Northern Division, in May, 1927, as above mentioned.

* * *

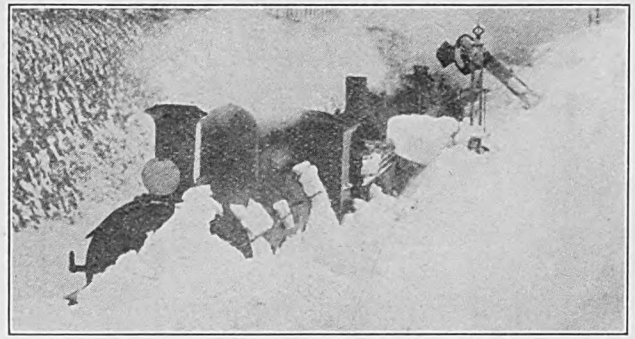
MR. T. E. ARGILE, who has been appointed Goods Manager, Northern Division, L.M.S.R., in succession to Mr. E. H. Davies, has held the position of District Goods Manager at Liverpool since November, 1925. Mr. Argile entered Midland Railway service at Derby in 1896, and after spending some time in the Goods and General Managers' offices, he went to Leicester to obtain station experience. In due course he returned to Derby as private secretary to the then Chief Goods Manager, the late Mr. Adie, afterwards being transferred to general inspector's work in the Derby district. In 1910 Mr. Argile was selected to undertake general station revision work all over the late Midland system. In 1915 he was appointed Assistant to the Outdoor Goods Manager, shortly afterwards going to Swansea as South Wales Traffic Superintendent. In 1919 he transferred to Leeds as District Goods Manager, and in 1923 became Assistant to the Chief General Superintendent of the L.M.S.R. for goods operating work. In May, 1925, Mr. Argile was appointed District Goods Manager at Leeds to amalgamate the three constituent companies' districts into one district, becoming District Goods Manager at Liverpool

Digitized by Google



Topical.]

A Heavy Snowdrift near Amesbury that practically covered a Signal and impeded Traffic Working.



[*Planet News.*

Three Southern Railway Locomotives held up in a Snowdrift near Amesbury.

Photopress.]

Landslide near Merstham Tunnel, Southern Railway, which caused Train Services to be Diverted.

[*Topical.*

Collapsed Bridge at Edmonton, L.N.E.R., which caused Train Services to be Diverted.

INCIDENTS OF THE CHRISTMAS AND NEW YEAR SNOWSTORMS AND FLOODS.

Digitized by Google

in November of the same year, as already mentioned.

* * *

MR. GEORGE MILLS, who has been appointed Assistant to the Chief General Manager, (Rates and Statistics), L.N.E.R., joined the service of the North British Railway at Edinburgh in 1895, and after eleven years in the Audit Accountant's Department of that railway, was appointed a Station Auditor. He returned to Headquarters in 1916 as Chief Clerk in the Coaching Department of the Audit Office, and in 1920 was transferred to the staff of the Chief Accountant as Special Auditor of the Accounts of the Spending Departments, Stores Department, &c. On the formation of the London & North Eastern Railway Company in 1923, Mr. Mills was asked to take charge of the Section dealing with Rates, Statistics and Accounts in the Department of the Chief General Manager.

* * *

MR. J. C. L. TRAIN, who has been appointed as from January 1 Assistant to the Chief General Manager (Works), L.N.E.R., was educated at Dulwich College and at Glasgow and Hull Technical Colleges. He entered the Engineer's Office of the North British Railway Company in Edinburgh as a pupil in 1908. He assisted in the carrying out of various works, including widenings at Portobello and between Thornton and Leven, before leaving the office as a Junior Assistant in 1912 to take up a post under his former chief, Mr. C. J. Brown, in the Engineer's Office of the Great Northern Railway. In August, 1914, he left the service of the company to enlist in the Royal Fusiliers. Later he was given a Commission in a Field Company, R.E., and saw considerable service at Ypres and on the Somme, where he was wounded in 1916. He returned to France towards the end of the war, being awarded the M.C. in 1918, and he was demobilised in June, 1919, with the rank of Major. He returned to the service of the Great Northern Company, and in 1921 he was appointed Personal Assistant to the Chief Engineer. In 1924, Mr. Train left the Engineer's Department to take up the post of Assistant Industrial Agent in the Chief General Manager's office, and in 1925 he was put in charge of the Works Section of that office as General Assistant to Mr. J. A. Wickham.

* * *

MR. G. SOWERBY, who has been appointed Estate and Rating Surveyor, North Eastern Area, L.N.E.R., was educated at Barnard Castle School, where he obtained a Scholarship of the Royal Agricultural Society of England for students under 20, passing first in Mensuration and Land Surveying. He entered the District Estate Office of the North Eastern Railway at York in January, 1896, and the whole of his service has been spent in that City. In 1920 he was appointed Assistant Estate Agent to the North Eastern Railway, and on amalgamation he has occupied that position in the North Eastern Area of the London & North Eastern Railway, being also appointed in 1924 Assistant Rating Surveyor. Mr. Sowerby served in the war with the 5th Territorial Battalion, West Yorkshire Regiment, subsequently holding the appointments of General Staff Officer, 3rd Grade, with the Second Corps, and of Brigade Major, returning to the railway service in January, 1919. He was thrice mentioned in despatches, being awarded the Military Cross and the Territorial Officers' Decoration.

* * *

IT is officially announced that the directors of the Great Western Railway Company have appointed Mr. W. H. Hall, Assistant District Goods Manager, Birmingham, to be District Goods Manager at Shrewsbury, vice Mr. O. J. White, who has recently been appointed Mineral Traffic Manager at Paddington.

* * *

WE are officially advised that Sir Arthur Watson, C.B.E., General Manager of the Buenos Ayres and Pacific Railway, is shortly retiring, and that Mr. Mervyn F. Ryan, Assistant General Manager, has been appointed to succeed him. Mr. Ryan was previously the Chief Mechanical Engineer of the Central Argentine Railway.

* * *

THE London Midland and Scottish Railway stated that Mr. S. H. Hunt, Vice-President (Railway Traffic Operating and Commercial Section), was not retiring at the end of 1927, but had agreed to continue in office for a further period.

* * *

LIEUT.-COL. WYNDHAM R. PORTAL, D.S.O., and Sir Gilbert Wills have been elected directors of the Great Western Railway Company, to fill vacancies on the board.

* * *

WE regret to record the death, on December 17, of Lord Lawrence of Kingsgate, a director and formerly Chairman of the London Midland and Scottish Railway.

* * *

WE regret to record the death, on December 20, at the age of 80, of Sir Frederick William Fison, Bart., who was a Director of the Great Northern Railway from 1885 until the close of the company's separate existence at December 31, 1922.

Digitized by Google

NEW L.M.S.R. APPOINTMENTS.

MR. D. C. CHESTER succeeds Mr. G. H. Mills (retired) as Goods Agent, Leeds (Hunslet Lane).

Mr. A. Clegg becomes Goods Agent, Huddersfield.

Mr. W. Hitchener is appointed Goods Agent, Brighouse.

* * *

MR. WILLIAM A. BLACK, of Montreal, has been appointed to the Directorate of the Canadian Pacific Railway, vice the late Mr. Charles R. Hosmer; Mr. Frederick W. Molson, who is already a Director, has been appointed to Mr. Hosmer's place on the executive committee.

P. & A. Photo.]

PASSENGER TRAIN IN NEWBURY STATION, G.W.R., SHOWING FLOOD WATER OVER TRACKS.

* * *

WE regret to record the recent death in his sixty-eighth year, of Mr. Frederick Joseph Restall, the originator of the half-day railway cheap trips so well known in connection with his name.

* * *

THE Minister of Transport has recently made an Order under the Railways Act, 1921, entitled the London & North Eastern Railway Order, 1927, authorising the construction of works and the acquisition by agreement of lands in the urban district of Walton-on-the-Naze, in the county of Essex, by the London & North Eastern Railway Company, and matters incidental thereto.

* * *

SIR HERBERT A. WALKER, K.C.B., General Manager of the Southern Railway, has consented to preside at the 67th Anniversary Festival in aid of the funds of the United Kingdom Railway Officers' and Servants' Association, which is to be held at the Trocadero on Wednesday, April 18.

* * *

MR. S. C. LITTLE, General Manager of the Sligo, Leitrim & Northern Counties Railway, was, on December 20, at the Irish Railway Clearing House, unanimously elected Chairman of the Irish Traffic Officers' Committee for the year 1928, and a vote of thanks was passed to the retiring Chairman, Mr. W. J. Bailie, Traffic Manager of the Great Northern Railway.

* * *

AT the annual dinner of the L.N.E.R. Advertising Department, which last year took place at York, on Saturday, December 17, Mr. W. M. Teasdale, Advertising Manager, L.N.E.R., who has been appointed Assistant General Manager (Parliamentary) and Industrial Agent as from January 1, was the recipient of a gold half-hunter watch from the members of his staff. Mr. Goodricke, Assistant Advertising Manager, made the presentation.

* * *

UNDER the chairmanship of Mr. John Wardle, Commercial Manager, Metropolitan Railway, supported by Mr. T. Taylor, President of the Middlesex County Bowling Association, Mr. T. Wilding and Councillor W. Marsh, a particularly successful gathering of over 100 members of the Metropolitan Railway Bowls Club and their wives and friends took place recently at the Moorgate Street Restaurant.

* * *

As a result of the 1927 inspection of the permanent way in the North Eastern Area, the L.N.E.R. have awarded cups or medals to the undermentioned railwaymen whose sections have been adjudged the best in their district :—

Best Inspector's Division.

Inspector Hill, Selby Division, York District.

Best Ganger's Length on Main Line.

Naburn length—Ganger Harper, Selby Division, York District.

Best Ganger's Length on Each of the Other Main-Line Districts.

District.	Length.	Ganger.
Northumberland	Longhoughton	Grieve.
Newcastle ..	Ouston ..	Ewbanks.
Bishop Auckland	Thinfold ..	Robinson.
Darlington ..	Otterington ..	Carter.

* * *

THERE was a crowded audience at Winchester House, London, to hear Colonel H. H. Mauldin, Superintendent, Eastern

Digitized by Google

Section, Southern Area, L.N.E.R., give a lecture on "American Railways," based upon his visit to the United States and Canada. The chair was occupied by Mr. W. G. P. Maclure, Locomotive Running Superintendent, Southern Area. Colonel Mauldin gave a number of his impressions of American railway methods and conditions, touching particularly upon signalling and traffic working at some of the big stations in various cities. In the main, he made it very clear that, allowing for essential differences in conditions, British railways have very little to learn from American lines, and that, in some respects, traffic is better handled in this country, particularly where intense conditions are concerned. An interesting discussion followed, in which many points were raised, attracting further comments upon the lecture.

* * *

A BULLETIN issued on November 25, by Mr. C. M. Jenkin Jones, Freight Rolling-Stock Controller, L.N.E.R., reports that during the five weeks ending November 19, more than one million freight wagons were loaded on the system. In the last week of the period, over 210,000 wagons were loaded, but as the bulletin points out, "Records are made to be broken," and all concerned are requested to co-operate in the endeavour to reduce the journey time of loaded wagons and so increase the number of empty wagons available.

* * *

A FAREWELL dinner was given recently by a few old colleagues to Mr. D. H. F. Meacock on his retirement from the service of the London Midland and Scottish Railway Company on November 30. Mr. Meacock spent the major portion of his career in railway publicity work, having joined the old London and North Western Publicity Department at its inception in 1909. He was well known to a large circle of friends in the publicity world and also in connection with the social side of railway work. He was a joint founder of the old *L. & N.W. Gazette*, the forerunner of the present *L M S Magazine*, and hon. secretary of the L. & N.W. Athletic Club for a number of years. He was made a life member of the London Railways Athletic Association, in view of his close connection therewith and the valuable services he had rendered.

* * *

COMMENTING on the naming of locomotives, Mr. Robert Langslow, writing from Seattle, Washington, U.S.A., mentions that the Boston and Maine Railway is working the "Minute Man" express by locomotives painted in broad bands of buff and blue, with red stripes between, and otherwise made to look "attractive and interesting"; that the Southern Railway (U.S.A.) is adopting similar methods; and that the express locomotives of the Baltimore and Ohio Railway are being named after presidents of the United States.

* * *

THE Derwent Valley Light Railway is in the centre of a large sugar-beet growing district, which feeds both the Second-Anglo-Scottish Beet Sugar Corporation's factory at Poppleton, York, and the Yorkshire Sugar Company's factory at Selby. The railway recently invited all growers in their district who are railing their traffic at D.V.L.R. stations to pay a visit of inspection to each factory, and arrangements were kindly made by the sugar-beet officials for the parties to be shown round and the process for the extraction of sugar from the beet fully explained to them. A total of over 50 farmers availed themselves of the opportunity of visiting the two factories.

* * *

THREE HUNDRED AND TWENTY-TWO stations in England and Wales, and 321 in Scotland, entered for the L.M.S.R. Station Gardens Competition for the season 1927. The six special prizes for England and Wales were awarded to Broxton, Alcester, Ashchurch, Charfield, Penns, Ockendon; the 13 special prizes for Scotland were awarded to Alyth Junction, Bowling, Bridge of Weir, Crieff, Dalrymple, Inches, Maryhill and Kirkles, Newtyle, Racks, St. Fillans, Strathaven Central, Thorntonhall, West Kilbride. A certificate is given to each station which is successful in securing a prize.

* * *

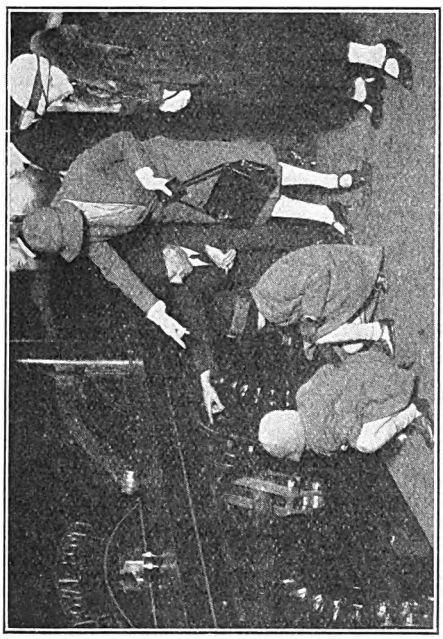
COLONEL SIR J. W. PRINGLE'S report in regard to the collision which occurred on October 5, at Brent Junction, Hendon, L.M.S.R., has been issued. The freight train was worked by 0-6-0 engine No. 3656, and, when moving into the sidings, was run into by an express from Manchester to St. Pancras, drawn by 4-4-0 engine No. 1020. Fog conditions prevailed, and responsibility for the accident is placed upon the express train driver, who failed to bring his train to a stand as rapidly as he could have done. One factor was that the fireman did not know the road sufficiently well for running under fog conditions, and, to some extent, misled his driver. Comments are also made as to the fog signalling arrangements.

* * *

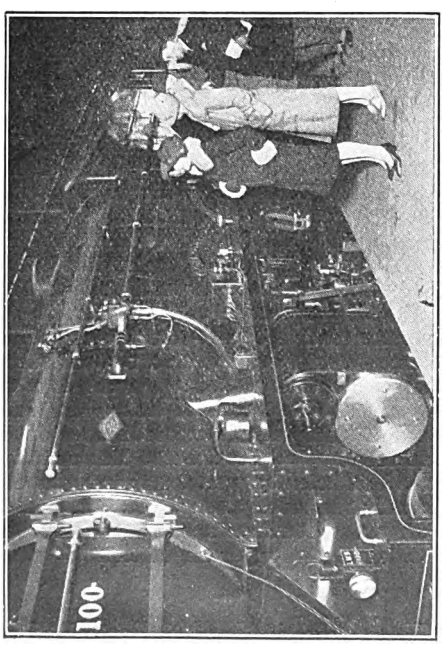
THE L.N.E.R. states that during a recent week-end (48 hours) 3,240 wagons

Digitized by Google

of sugar beet, with an average load of 7 tons 15 cwt. per wagon, were forwarded to 10 sugar beet factories on their system. During the month the L.N.E.R. had handled more than the total quantity of sugar beet for the whole of last season, which lasted from October to the end of January, 1927. During the twelve weeks ended December 16, over 100,000 loaded wagons of beet have been moved without interfering in any way with other L.N.E.R. traffics. This has only been possible by mutual co-operation between the railway companies, the National Farmers' Union and the factory managements, who, by agreement, instituted a scheme of control. This has permitted this special seasonal traffic to work freely without interference to the normal routine of the railway services.



[Topical.



Photos.]

THE "ROYAL SCOT" ON EXHIBITION AT EUSTON.

* * *

THE Great Western Railway states that arrangements have been made which will result in about 100 country lorry services being established at various points of their system. "These services are for the benefit of farmers, village storekeepers, and others in getting their parcels and perishable traffic to and from the railway. Especially low collection and delivery rates have been fixed for distances up to about 10 miles. Many large manufacturers, realising that this affords an economic means of reaching their rural customers, are taking advantage of the service to save the cost of providing fleets of lorries."

* * *

THE L.N.E.R. announces that co-operative road collection and delivery services have been established by arrangement with local motor hauliers for farm produce and other commodities at specially low rates at more than 600 stations on their system. "General charges on the basis of 3s. per ton up to 3 miles, and between 4s. and 6s. per ton up to 10 miles, are made. These experimental services have been very successful in Northumberland, Durham, Yorkshire, and East Anglia, and are being added to from day to day. There is no profiteering, and the farmer will get a square deal. The scheme is liked already by farmers and traders."

* * *

COLONEL SIR J. W. PRINGLE'S report to the Ministry of Transport on the collision which occurred on October 7, near Old Oak Common, G.W.R., has been issued. A train of empty coaches, drawn by 2-6-0 engine No. 7315, was run into by a motor train worked by 0-4-2 tank engine No. 216, running, in this case, at the rear. This accident occurred under fog conditions, and it is suggested that the empty carriage train had been overlooked by the signalman concerned; the principal responsibility is, therefore, placed upon him.

* * *

THE 11.15 a.m. Harrogate to King's Cross Pullman train on December 14 passed

Digitized by Google

Grantham six minutes behind time, but arrived at King's Cross at 3.19 p.m., one minute ahead of schedule, having covered 105 miles in 104 minutes. Engine No. 4436, Driver Barnes (King's Cross).

* * *

WORK has begun on improvements at Doncaster, St. James's Bridge station, on the Great Central Section, L.N.E.R., which are intended to facilitate the transhipment of goods. Two platforms are to be roofed over to provide a goods transhipping station. The station is used chiefly for the handling of goods, but during the September race week passenger traffic from Sheffield is directed to those platforms. The contractors are Samuel Butler & Co., of Stanningley, Leeds.

* * *

THE L.N.E.R. are advised by the Det Forenede Dampskibs-Selskab, Copenhagen (Royal Danish Mail Route), that they have decided to construct an additional motor vessel for this service. The motorships *Jylland* and *Parkeston*, with the latest vessel, make an addition of three new ships for this route within the last three years. The service, which is maintained daily by the motorships and the s.s. *A. P. Bernstorff*, affords an excellent and comfortable connection between Great Britain and Denmark, Sweden and Norway. The service is run in conjunction with the Danish State Railways and the London & North Eastern Railway Company.

* * *

DURING the past year the L.N.E.R. have carried out very extensive repairs to their staiths at Dunston, on the River Tyne. These staiths, of timber trestle construction, were built in 1892, and doubled in 1898 to provide six berths, each equipped with two sets of spouts. The work last year comprised the reconstruction of the whole of the decking on one side of the staiths and necessitated the use of about 70,000 lineal feet of decking and 16,000 cubic feet of square timber. In carrying out the deck renewals, the hoppers have also been reconstructed, and the opportunity was taken to effect a slight enlargement and to increase the teeming height. It is proposed to treat the other half of the staiths similarly during this year.

* * *

HELMDON station, L.N.E.R., has been renamed Helmdon for Sulgrave. This station serves Sulgrave Manor, which is probably better known in America than it is in England, as it was the home, in the 16th century, of Laurence Washington, an ancestor of the famous President.

WHILST travelling in South Wales just before Christmas, Mr. R. A. H. Weight writes: "I noticed posters announcing what was, at any rate to me, a novel form of combined cheap ticket enterprise on the part of the G.W. Company. Each weekday from January 2 to 20 (except Saturdays) return tickets were issued from Swansea to Cardiff by two afternoon trains at a fare of 7s. These tickets included a reserved seat for the pantomime at the Cardiff Empire and were available for return by a fixed train the same night. The railway mileage is 45¾ each way. Forty-eight hours' notice was required of intending passengers."

* * *

WITH regard to references to gradient boards bearing figures which suggest that it seems rather unnecessary to indicate a gradient at all, Mr. R. Dyson mentions instances on the L.M.S.R. of boards showing gradients of 1 in 6,977, near Wilmslow; of 1 in 9,368, near Alderley Edge; of 1 in 7,380, between Alderley Edge and Chelford; and of 1 in 7,071, between Holmes Chapel and Sandbach. He also mentions one of the Rhyl and Denbigh branch, at Rhuddlaw, marked as 1 in 6,800.

* * *

THE Wimbledon and Merton Hobbies and Handicrafts Exhibition was held at the Technical Institute, Gladstone Road, Wimbledon, from Monday, January 2, to Saturday, January 7. Among the items of special interest was the exhibit of the Wimbledon Model Railway Club, who had their passenger-carrying model railway in operation.

* * *

THE annual dinner of the Railway Club was held at the Manchester Hotel on Friday, December 16, under the chairmanship of Mr. Cecil J. Allen, President. Brief addresses were given by the President; Mr. J. F. Gairns, Editor of the RAILWAY MAGAZINE; Mr. J. R. Hind, Information Agent, L.N.E.R.; Mr. Kenneth Brown, and Mr. Mitchelhill.

* * *

MR. H. J. A. MAKEE points out that the plan of Buchanan Street passenger and goods stations given on page 2 of the January number does not show the double crossovers between Nos. 3 and 4 platform lines, as indicated in the photographic view on page 4. This is due to the small scale of the plan, though admittedly the second crossover should have been shown. The reference to the Pullman car of the, 7.50 p.m. ex Aberdeen is, however, correct. This car runs from Perth on the Glasgow portion, which goes to Central (due 12.17 a.m.)

Digitized by Google

instead of Buchanan Street. It is sent round from Central at 10.55 a.m. next morning for the 1.30 p.m. Glasgow-Aberdeen service. The 5.30 p.m. ex Aberdeen runs to Buchanan Street. The map reference on page 54 should have associated the Forth and Clyde line with the L.N.E.R., not the L.M.S.R.—a draughtsman's error which escaped notice.

* * *

To meet the needs of the Great Western Railway Christmas traffic, non-stop trains were specially introduced as follows:—Paddington and Stroud (102¼ miles); Paddington and Torquay (199¾ miles); Paddington and Cardiff *via* Badminton (145 miles). Also, from Paddington to Fishguard Harbour *via* Cardiff, Court Sart Junction, and the Swansea District line, calling only at Cardiff for engine purposes.

* * *

On December 5, 6, 7 and 8, No. 6149, of the new "Royal Scot" class, was on exhibition at platform No. 3, New Street station, Birmingham. Over 16,000 people inspected the engine during the four days. As usual, a small charge was made for the benefit of hospitals and charities.

* * *

In view of statements that it was contemplated to run from King's Cross to Edinburgh without intermediate stop, the L.N.E.R. state that they do not confirm these, in that the services to be run next summer have not yet been considered, while there will be no drastic changes in the train services before April next.

* * *

On a recent Sunday the complicated crossing at the north end of York station, where the up and down main north lines intersect the up and down lines running into York goods yard from Scarborough, was renewed, using cast manganese steel sections.

* * *

The L.N.E.R. Company has issued an attractively-designed poster on which are two large discs, one white and one red, on a black ground. On these are printed: "The L.N.E.R. uses 5,000,000 tons of coal per year, keeping 28,000 British miners constantly employed." Below are the words: "We help your industry—travel by the L.N.E.R. and help ours."

* * *

The Railway Benevolent Institution has received a cheque for £173 8s. 3d. from the L.M.S. Railway, being the proceeds of an exhibition at Euston Station of one of the "Royal Scot" locomotives.

The Railway Companies announce that the availability of return halves of ordinary return tickets by railway for distances exceeding 12 miles has been extended from two months to three months. For distances up to, and including, 12 miles, return halves are available for two days, or from Saturday to Monday. The availability of tourist, circular tour and walking tourist tickets will this year be extended from two calendar months to three calendar months.

* * *

Holders of day and half-day excursion tickets travelling by special excursion trains will henceforth be allowed free on the return journey 60 lb. 3rd class, 120 lb. 1st class, of goods they have purchased for their own use. On the forward journey only small handbags, luncheon baskets, or other small articles intended for the passenger's personal use during the day are allowed. Passengers travelling with cheap tickets by ordinary trains are allowed to take with them free 60 lb. 3rd class, 120 lb. 1st class, of goods for their own use not for sale.

* * *

Mr. L. A. Garrard writes:—"On December 26, a snow-plough passed through Romsey from Eastleigh, driven by Nos. E 0509 and E 164, with a brake-van in rear. On December 28, the up Atlantic Coast Express passed through Romsey, with No. 774, *Sir Gaheris*. It ran in the direction of Southampton, presumably to avoid reversing at Eastleigh. It passed at about 3.40 p.m."

* * *

We regret to record the death of Councillor E. Lewis, J.P., who has for 12 years acted as Director and Chairman of Messrs. Bassett-Lowke Limited. Mr. G. P. Keen has been appointed in his stead. Mr. Keen is well known to most of our readers as an enthusiastic model maker, and chairman of the Model Railway Club.

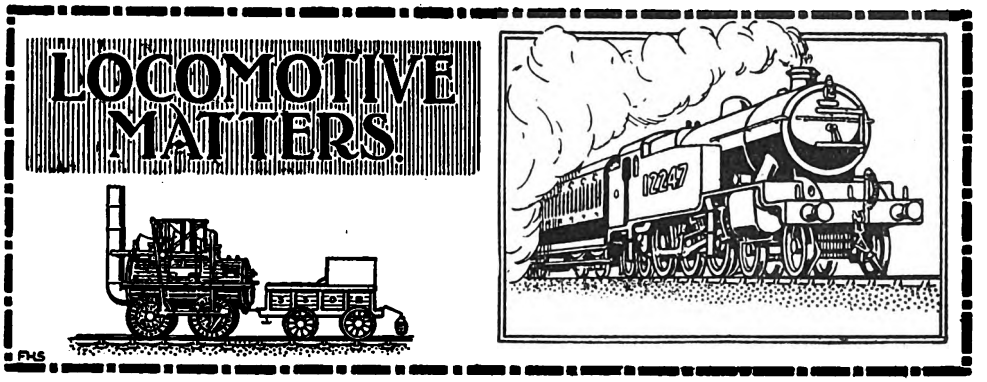
* * *

Mr. C. Lewis Edwards, C.B.E., F.C.I.S., Chief Accountant, L.N.E.R., has been appointed Secretary to the firm of Thompson, McKay & Co. Ltd., upon the transfer of their registered office from Manchester to London.

* * *

Meetings of the Wimbledon Model Railway Club include, on February 6, a talk on "Concrete and Asphalte Surfaces," by Mr. Phillips, of the Steel Mesh Road Surfaces Limited, and on February 20 a lantern lecture on "The Sentinel Steam Locomotive," by Mr. J. W. Beaumont, of the Sentinel Waggon Works Limited.

Digitized by Google



Under this heading will be inserted short references to news items relating to locomotive engines and their duties. It must be understood, however, that information as to the stations of particular engines cannot be given, for the reason that, before the date of publication, transfers may have taken place, while lists of engines, &c., debarred from "The Why and the Wherefore" section, cannot be included under this heading. With this understanding, notes as to matters thought to be of general interest will be welcomed.

L.M.S.R.

New "Royal Scot" class, three-cylinder, 4-6-0 No. 6145, was noted on Christmas Eve, passing Kettering, Midland section main line, on the 3.30 p.m., St. Pancras to Leeds and Bradford express. One of the new Horwich built 2-6-0's was also observed on the 9.33 a.m. Manchester to St. Pancras express.—[W. Lewis.]

The L.N.W. section "Princes" fitted with outside valve gear are nicknamed "Tishys" because of the resemblance to the "motion" of the celebrated race-horse. New 2-6-0 No. 13045 recently worked an excursion between Lime Street, Liverpool, and New Street, Birmingham.—[G. E. Brown, Junr.]

Midland section 0-4-4T's Nos. 1249 and 1277 are now at Huddersfield (20) shed. A Furness 4-4-0 is also working in the district. —[A. Kinder.]

Owing to the closing of Hellifield, L. & Y. section, sheds, 0-6-0 goods engines Nos. 1252, 12103, 12128, 12201, 12214, 12244, 12255, 12301 and 12451, have been transferred to Normanton. Midland class "3," 0-6-0's Nos. 3429, 3731, 3733, 3734, 3736, and 3799, until recently stationed at Normanton (26) shed, are now attached to Leeds (28) shed. Two L. & Y. 0-4-0 shunting engines, renumbered 11205 and 11230, were noted coupled together passing Chesterfield. It is understood that they were on their way to Burton for shunting duties in the Brewery yards. New 0-6-0T's Nos. 16625, 16626, 16627, and 16628 have just been delivered to Normanton shed from the Hunslet Engine Company, of Leeds. Class "4" 0-6-0's Nos. 4334, 4335 4336 and 4337 have been transferred from Derby and are now stationed at Normanton (26) shed. 2-6-0 No. 13074 was recently noted attached to a Manchester train at Leeds, New Station.—[H. Scott.]

New L.M.S.R. 2-6-4T No. 2300 and 4-6-0 No. 6145 were noted at Derby on December 10.—[E. B. Sutcliffe.]

New class "4" 0-6-0's Nos. 4492, and 4494-4499 are working goods trains in the Nuneaton district. 2-6-0 No. 13076 was recently seen at Birmingham on a local train.—[F. V. W.]

Caledonian section 0-8-0 No. 17922, 0-4-0ST No. 16005, and G. & S.W. 0-4-0ST No. 16041, 4-4-0's Nos. 14120, 14187, 14193, 14220, 14228 and 14254 have been withdrawn from service. Standard 0-6-0's noted on Caledonian section include Nos. 4187-8 stationed at Aberdeen, 4477, 4493, 4496, 4498-500, and 4506 (N.B. Loco. Co.). A series of six, Nos. 4312-17 have been delivered from the St. Rollox shops to the Highland section, while No. 4318 is temporarily at Balornock, Glasgow.—[Adam Kennedy.]

"Royal Scot" class 4-6-0 locomotives now stationed at Camden include four that were previously attached to Carlisle shed, viz., Nos. 6101-4. They have been replaced at Carlisle by others from Crewe. A further five 0-6-0's have been completed at Crewe, Nos. 4442-6. Twenty similar engines have been delivered by the North British Locomotive Company, Nos. 4487-4506, and 25 by Messrs. Barclays, Nos. 4357-81. Thirty in all have been built by the North British Locomotive Company, but the first 10 engines, Nos. 4477-86, are attached to Western "B" division. New standard 0-6-0's, Nos. 4402-3, have been transferred to the Midland division. Class "G," 0-8-0's, Nos. 9071, 9087, 9116 and 9149 (old Nos. 1274, 2660, 1660 and 1277), and class "D," 0-8-0's, Nos. 9006 and 9021 (old Nos. 1863 and 1876) have been converted to class "G1" (superheater). Several additional "Precursor" class 4-4-0 locomotives

Digitized by Google

have been taken out of traffic, including Nos. 229 *Stork* and 622 *Euphrates*. Other withdrawals comprise Nos. 271 *Minotaur*, and 1685 *Gladiator* (6 ft. 6 in. "S.L." class); No. 486 *Skiddaw* (6 ft. "S.L." class); No. 1922, *Intrepid* ("Renown" class); No. 1555 (class "B" compound) and No. 3430 (Spec. D.X. goods). Reconditioned ex-R.O.D. 2-8-0 type locomotives at present in service bear Nos. 9646, 9647, 9649, 9650, 9652, 9653, 9654 and 9656. "Claughton" class locomotives Nos. 5980 and 6024 have just left the Crewe shops without the usual large figures on the tenders, but with the engine number painted on the cab panels and with the letters L M S on the tender sides.—[C. WILLIAMS.]

0-6-0T No. 16428 is at Longsight (16) shed, Manchester. 0-6-0's Nos. 4347-4351, are also at this shed. L.N.W. 2-4-2T Nos. 6666, 6680, 6684-6683 and 658, with 0-6-2T No. 6918 work to Leek from Stafford (14) shed. L.N.W. 0-6-0 No. 8513 has been rebuilt with Belpaire firebox, &c., and is working from Burton (Midland shed 2). No. 65 of the same class, unrebuilt, is also stationed there. N.S. 0-6-0 locomotives are being renumbered in the Western Division "A" list. Two of the 2320-2367 series have been noted renumbered as 8651 and 8672.—["MOONSTONE" and "BABYLON."]

L.N.E.R.

"N 7" class 0-6-2T No. 2651 has now been transferred to King's Cross shed. Well-known G.N. section express drivers who have recently retired are:—Driver Bullock of Leeds, who worked the *Queen of Scots* Pullman between Harrogate and London with G.C. "Director" engines. He also drove the first non-stop excursion from Leeds Central to King's Cross, this being one of the fastest-timed long-distance "cheap" trains in the world.

B. Codd of Doncaster, who, with the late Driver Buxton, shared the driving of Mr. Gresley's pioneer Pacific, 1470, when she was first put into service.

F. Hill of London, whose engine latterly had been 2553, *Prince of Wales*, and for many years drove the Atlantic 1428.

It is understood that Annesley, G.C. shed, passenger engines are being transferred to Colwick, G.N. shed.

On December 8 the Eason day-excursion from Cleethorpes, &c., arrived at King's Cross hauled by small G.N. 4-4-0, 4077, piloting G.C. 4-6-0, 5072.

The new through express from Leeds Central to Nottingham, Banbury and Bournemouth is worked between Leeds and Nottingham, *via* Doncaster, Tuxford and Mansfield, by Doncaster G.N. Atlantics; usually of the small-boilered type, including the only inside cylindered one, viz., 3271.—[R. A. H. W.]

G.N. 2-6-0's No. 4662 and 4664 have been working on the G.E. section.—[F. LEMMON.]

Locomotives noted recently on the Liverpool-Harwich Continental express between Manchester Central and March, include G.E. 4-6-0 No. 8555 and G.C. 4-4-0 *Prince Henry*. —[C. M. H. FIRSON.]

New 3-cylinder 4-4-0 No. 234 *Yorkshire* visited Manchester Central recently on trains from Sheffield, Victoria.—[R. DYSON.]

N.E. 4-4-2's Nos. 2168 and 2172 have been working into Manchester on excursion trains from the N.E. district.—[W. QUINTON.]

Nos. 264, 265 and 266 of the new 3-cylinder 4-4-0 "D49" class are out from Darlington shop, and Nos. 234 and 251 are working from Leeds, Neville Hill shed, to which depot several more of this type are shortly to be allocated. 3-cylinder 4-4-2 No. 2163 is running fitted with a "Dabeg" feed water heater.—[J. W. ARMSTRONG.]

G.E. class "J69" 0-6-0T's Nos. 7342. 7376, 7391 and 7392 have been to Glasgow.—[ADAM KENNEDY.]

New 4-4-0 No. 251 *Derbyshire* was noted at Leeds (New) station on a Newcastle express *via* Harrogate.—["BABYLON."]

New 4-4-0's Nos. 264 *Stirlingshire* and 265 *Lanarkshire* are working between Edinburgh and Glasgow.—["EVANDHU."]

G.W.R.

Four-cylinder 4-6-0 No. 6000 *King George V* bears various mementoes of its recent visit to America. These take the form of a bell, placed on the leading buffer beam in front of the inside cylinder front covers, and two medals on the cab sides. The bell bears the inscription

PRESENTED TO LOCOMOTIVE KING GEORGE V
BY THE
BALTIMORE AND OHIO RAILROAD
IN COMMEMORATION OF ITS
CENTENARY CELEBRATIONS
Sept. 24—Oct. 15, 1927.

The cab-side medals, which are circular and framed in brass, glass covered: the first shows the obverse side and the second the reverse side. The first also shows a modern B. & O.R.R. train around which is the inscription: "100 years, safety, speed,

Digitized by Google

strength." The second shows the locomotive *Tom Thumb*, the inscription in this case being, "The Baltimore & Ohio Railroad Company, 1827-1927."

The Westinghouse brake pump on the left-hand side of the smoke-box has been removed. An interesting link between the old *Great Bear* and its present-day successor *Viscount Churchill*, lies in the number plate on which is still inscribed, "Engine Class 4-6-2." "Duke" class 4-4-0 No. 3254 *Columbia* has appeared from the shops, with a 3,500-gallon tender in place of the small 3,000-gallon one as formerly carried by this engine. She has been stabled at Didcot. Previous to the overhaul it was at Reading. No. 3285 *Katerfelto* of the same class has also been overhauled, repainted, &c., and returned to Reading sheds. A 2-4-0T, No. 628, recently worked into Reading on a director's saloon special.—[R. WEBSTER.]

New class "45XX" small 2-6-2T's Nos. 5505-5508 are working local services in the Birmingham district in place of "Flower" class engines recently scrapped. 2-8-0 No. 4701 was noted on a passenger train at Snow Hill.—[F. N. W.]

The following "Stars," replacing "Saints," are now stationed at Worcester shed for working London expresses: Nos. 4017 *Knight of Liege*, 4024 *Dutch Monarch*, 4031 *Queen Mary*, 4942 *Prince Albert*, 4066 *Malvern Abbey*. "Duke" class 4-4-0 No. 3286 *Meteor* has returned to Reading shed.—[F. J. T.]

No. 4073 *Caerphilly Castle* has been fitted with Ross "pop" safety valves and new large capacity tender.—["BABYLON."]

IRISH RAILWAYS.

Great Southern.

Recently four locomotives not seen in Bray for some time made their appearance there, old M.G.W. 2-4-0 No. 34 *Aurora*, still running in its old livery, also D.S.E. No. 4 (0-6-0) on the Enniscorthy goods. No. 442, 0-6-0 type has been working in Bray district, shunting and working trains to and from Greystones. No. 452 (4-4-0) recently transferred to Bray shed for a few days, exchanging with 4-4-0 No. 454. No. 424 (2-4-0T), was damaged as it was passing Seapoint Station on the night of October 29, during the great gale, by a tree falling on the bunker; the locomotive is again in service. On December 8, a special excursion train from Wexford to Dublin, consisting of seven bogie coaches and two "six-wheelers," was hauled by 4-4-0 No. 340. M.G.W. 0-6-0 *Luna* still works from Bray Shed on P.W. Dept. trains and No. 449 (0-6-0) has been similarly engaged from the same shed. Nos. 453 and 334 (both 4-4-0's) have been employed on and off on the "mail" for some time. 0-6-0 Nos. 446 and 447 are engaged regularly on the Enniscorthy goods, and 0-6-0 No. 444 and 2-6-0 No. 16D on the night goods. 4-4-0's Nos. 450 and 452 from Wexford shed, and Nos. 453-4 from Bray shed, work on the passenger main-line trains. Nos. 86 and 334, G.S.W. locos., also work on these trains from Wexford and Bray sheds respectively. Except the goods engines the former D.S.E. locomotives do not change their sheds. At Westland Row 2-4-0T's 423,424, 2-4-2T's, 427,438, 4-4-2T's, 455-60 are stationed. The 2-4-0T's work a lot in connection with the mail boat trains, No. 427 shunts mostly at Westland Row, and the 4-4-2T's work through from Amiens Street to Greystones. At Bray, 2-4-0T 425, 2-4-2T's 428, 430-37, 439 are stationed. No engines now shed at Harcourt Street, the Bray engines working this line also running to Westland Row and taking turns on the Dalkey to Westland Row train service. The head codes, discs, &c., in use under the old D.S.E. régime have not been changed up to the present.—[CHAS. J. COGLAN.]

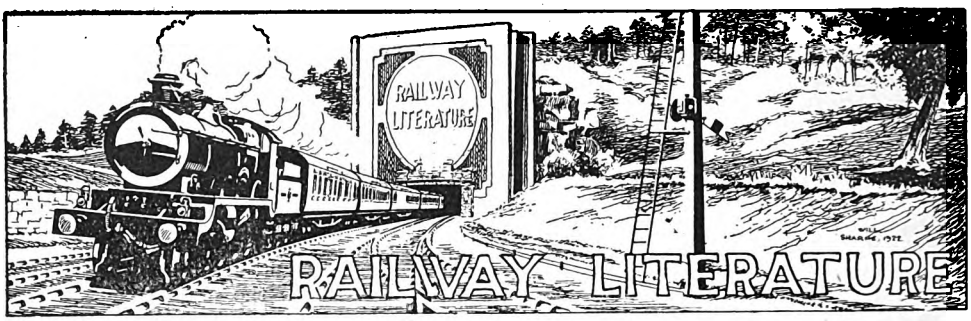
4-4-2T No. 459 (54) has been returned to Canal Street shed after an absence of many months at Inchicore, and is now acting as spare engine there. Beyer Peacock 4-4-2T No. 34 is again in traffic, and still retains her old number and D. & S.E. livery. She and 0-6-0 No. 4 are now the only two remaining engines of the former D. & S.E.R. retaining their old numbers and livery. No. 4, however, has a tender off another engine painted black.—[J. J. KENNEDY.]

Great Northern.

2-4-2T No. 95, recently overhauled at Dundalk Works, has been sent to work the Belturbet branch, replacing No. 94 of the same class withdrawn for repairs. No. 95 has been fitted with brake gear now operating on the leading and trailing bogies, as well as the coupled wheels. Over 100 wagons of cattle were operated over the Belturbet branch in one day recently from a Western fair. "D" class 0-6-0's from Adelaide shed took over the trains, after trans-shipment from the C. & L. light railway (now G.S.R.). "D" class No. 13 is at present working passenger trains over the Clones-Cavan section.—[J. J. KENNEDY.]

Acknowledgment is also due to W. S. Bevan, James M. Johnston, C. J. Thomson, D. J. W., and F. R. W. for notes on observations made during the month.

Digitized by Google



RAILWAY AND LOCOMOTIVE HISTORICAL SOCIETY, BULLETIN No. 15.

This number maintains the interest of its predecessors, and among the principal items of interest may be noted a detailed description of "The Fair of the Iron Horse," which formed an important section of the Baltimore & Ohio Railroad recent centenary celebrations, articles on various historical locomotives, the first locomotive in the State of Maine; a Bury engine of 1848, still preserved by the Great Southern Railways of Ireland; Saint John and the Canadian Pacific Railway; notes on British locomotives; the genesis of the locomotive truck, &c. Copies and further particulars can be obtained from Mr. G. W. Bishcp, 57, Warwick Road, Kenilworth, Warwick. We are advised that the room at the Baker Library, Harvard University, which has been allocated to the Railway and Locomotive Historical Society, is now complete. In regard thereto, the President, Mr. C. E. Fisher, writes as follows :—"There are two hundred framed pictures on the walls covering early locomotives and timetables, and we have much miscellaneous material of no little value. In time we hope to index this material for the benefit of our members. We are extending a cordial invitation to every railroad man or anyone else interested in early railways or locomotives to visit this exhibition and this room."

MESSRS. RICHARD TILLING, of 106, Great Dover Street, London, S.E.1, send a copy of their 1928 calendar. This is designed for hanging up, with a sheet for each month, and for general office use. It is neatly and artistically printed, without undue elaboration.

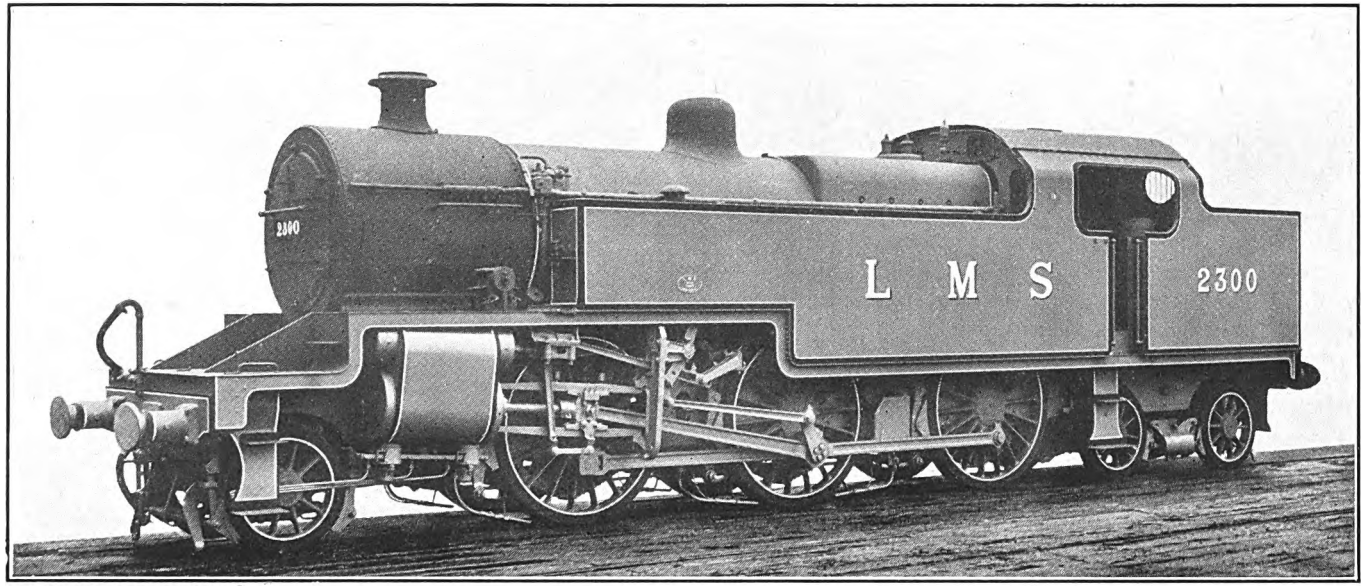
SOUTHERN RAILWAY ADVERTISING SERVICE.—A beautifully got-up brochure emanates from the Trade Advertising Agent, Advertising Department, Waterloo Station, S.E., and is designed to convince prospective advertisers that no other media give a greater value for money spent than the spaces on the Southern Railway. Reference has already been made in these columns to the Southern Railway's new advertising scheme which came into force on the first day of the year, and the brochure now under notice is an amplification of the details already divulged. It consists of 10 pages of illustrated letterpress printed on fine art paper, enclosed in a wrapper that, for sheer artistry, may be regarded as the very last word in commercial advertising. Some of the pages are coloured, and one of the best of the 10 is that which is headed "On the Right Track for Business," and which shows a track section and a platform hoarding with the "ads" thereon clearly and attractively arranged, with the pertinent intimation that "platforms similar to the above are used by thousands of season-ticket holders every day." Another page that specially appeals, as it seems to us, is that numbered six, and which shows the latest device for advertising on bridges. Red on black and white is employed in most effective fashion, and as an object-lesson to a new customer there can be no doubt whatever as to its value. The tenth page in the book is a reproduction of the clever poster "Keep your sales up," to which special mention was made in our former reference.

MR. W. BRYDE, of 20, Water Street, Liverpool, Special Agent of the Pennsylvania Railroad in this country, sends a copy of the calendar for 1928 issued by his company. The main feature is a large view in colour—somewhat impressionistic but distinctly attractive—showing the "Broadway Limited Express," which covers the journey between New York and Chicago in 20 hours, "meeting the dawn." The calendar, which is of substantial size and designed to be hung up, otherwise includes features to which we have previously referred. Accompanying it is a leaflet giving particulars of the "Broadway Limited" and other Pennsylvania Railroad express trains. We have also received some neat washable cards for pocket or pocket-book use containing on one face a view in colours of the "Broadway Limited Express," and on the back a calendar for 1928, and along one edge a 3½-in. measure.

THE Westinghouse Brake & Saxby Signal Co. Ltd., send a useful little desk calendar of the "Boldefigger" type.

Digitized by Google

Digitized by Google



THE RAILWAY MAGAZINE.]

NEW 2-6-4 PASSENGER TANK ENGINE, L.M.S.R.

Designed by Sir Henry Fowler, K.B.E., Chief Mechanical Engineer.

Cylinders, 19in. × 26in. Coupled wheels, 5ft. 9in. diam. Steam Pressure, 200 lbs. per sq. in.
Heating Surface—Tubes, 1,083 sq. ft., Firebox, 137.25 sq. ft.; Superheater, 266.25 sq. ft.;
Total, 1,486.50 sq. ft. Grate Area, 25 sq. ft. Adhesion Weight, 51 tons 7¾ cwts.;
Weight in Working Order, 86 tons 5 cwts.; Tractive Effort, 23,125 lbs.; Coal Capacity, 3½ tons.; Water Capacity, 2,000 galls.

Digitized by Google

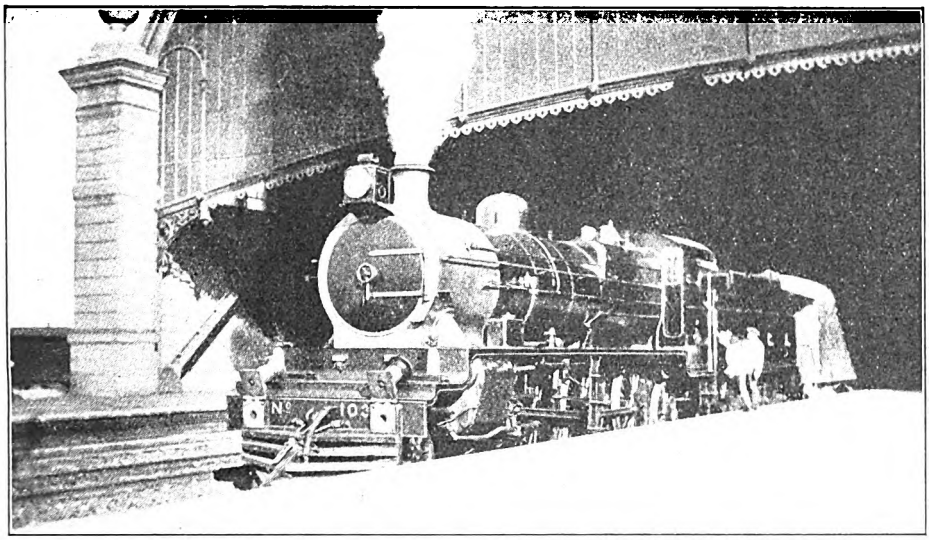


Photo.] [*I. A. Barrett.*

5.0 P.M. TUCUMAN EXPRESS AT RETIRO STATION.
4-6-2 Locomotive No. 103 (oil-burning).

A Notable Railway Station in Buenos Aires.

RETIRO TERMINUS—CENTRAL ARGENTINE RAILWAY.

By H. R. STONES.

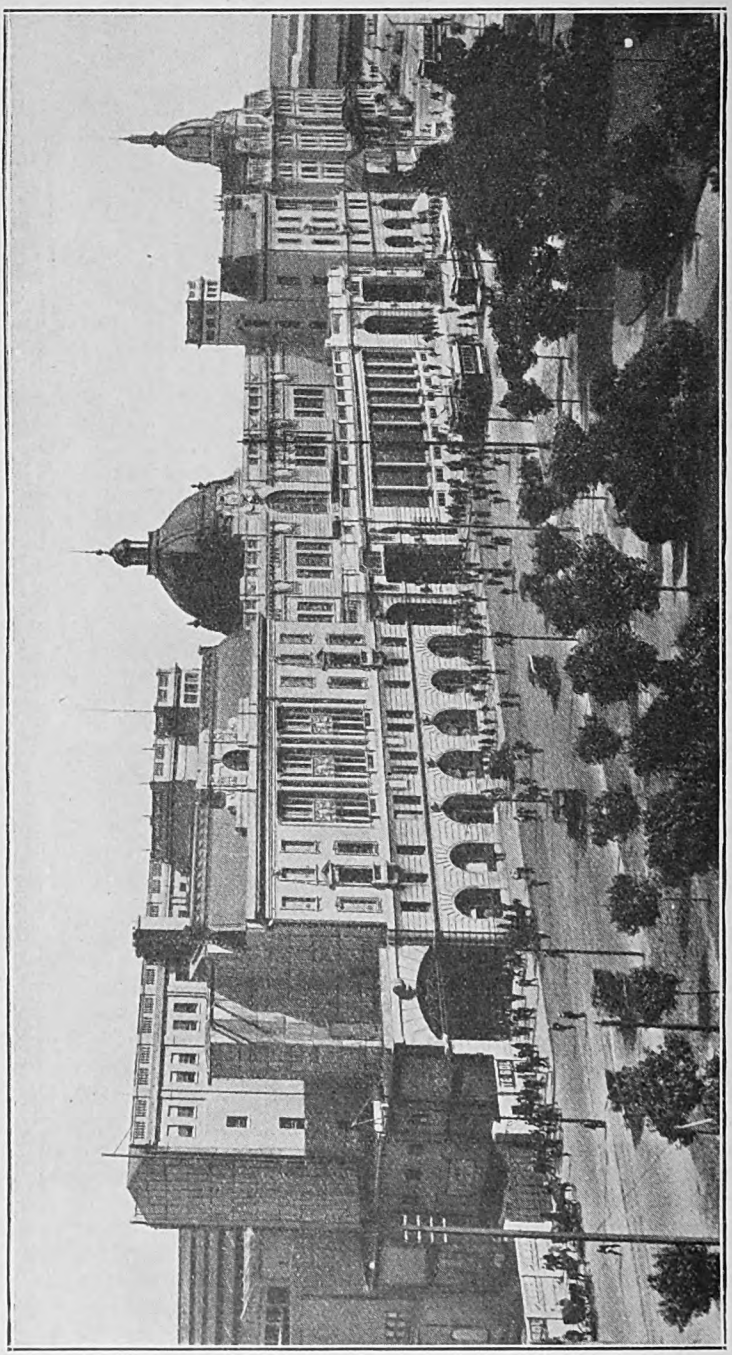
ANY readers who have visited the capital of the Argentine Republic during recent years will agree that the Retiro terminal station of the Central Argentine Railway in Buenos Aires can fully justify its position as undoubtedly the finest railway station in South America. Although not as large as such termini as the Grand Central or Pennsylvania stations in New York, Retiro can challenge comparison with some of the premier stations in the world in point of convenience and completeness, embodying, as it does, all modern improvements.

Standing close to the Docks and the New Port, Retiro has a frontage of 174 yards facing the Avenida Maipú and the Plaza Britanica, the station buildings being surmounted by a central dome, the top of which is approximately 108 ft. from the ground. By reason of its architectural excellence, the Retiro terminus, as it stands at the present time, can be placed in the fore among the many fine and imposing buildings of the capital of the great Republic of Argentina.

The history of the Central Argentine Railway in Buenos Aires dates back to 1870, when in June of that year an agreement was entered into with the Western Railway of Buenos Ayres to exercise running powers over the latter company's line from Lujan to Buenos Ayres (Once), a distance of just over 41 miles. The facts leading up to this agreement. and finally the construction of the present Retiro station, are of historical interest.

The Central Argentine Railway was originally founded by William Wheelwright in April, 1863, for the construction of a line from Rosario to Cordoba. However, after some years of working the original concession, the company com-

Digitized by Google



GENERAL VIEW OF RETIRO STATION, CENTRAL ARGENTINE RAILWAY.

The Cordoba Central Station is to the right.

Digitized by Google

menced to look further afield, with a view of eventually reaching Buenos Aires. As a result of this, a line was constructed during the years 1888–1890 from Cañada de Gomez to Pergamino, and in 1890 the Central Argentine Railway took over the Northern Railway of Buenos Ayres on lease. This latter railway was incorporated in January, 1889, and comprised a line from the Old Central Station in Buenos Aires to Tigre, which portion now forms the existing electrified section of the Central Argentine Railway between Buenos Aires and Tigre.

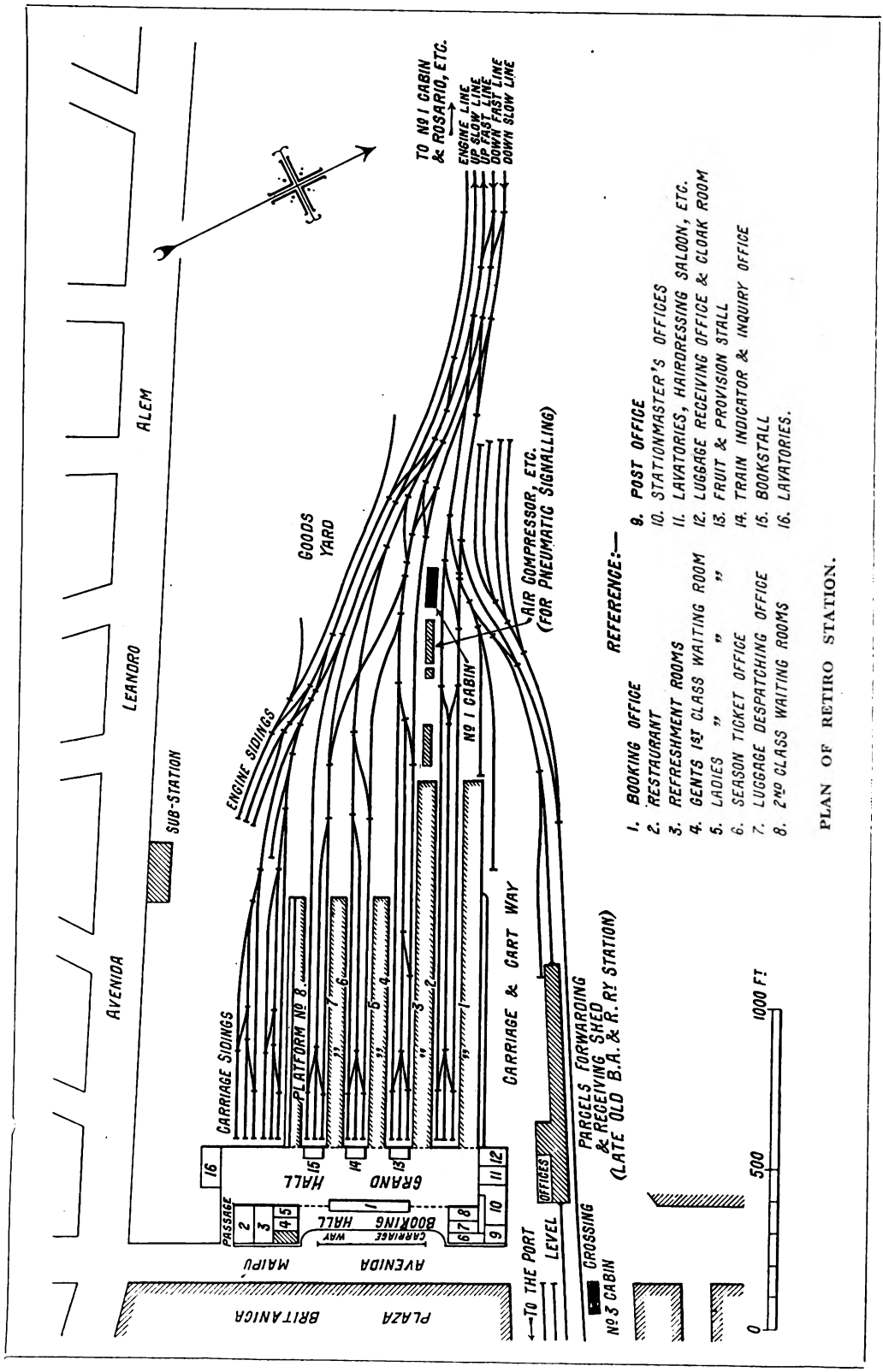
Unfortunately, the ex-Northern Railway of Buenos Ayres was completely isolated from the Central Argentine Railway at this period, but a concession was obtained in 1890 to connect up the two railways by the construction of a line from Pergamino to San Fernando near Tigre. This scheme, however, never materialised, owing to the Provincial Government Railway of Buenos Ayres being put up for sale, and for the purpose of purchase the Western Railway Company was floated. As a result of these and other transactions, the Central Argentine Railway took over the ex-Provincial Government line from Pergamino to Lujan and obtained running powers over the Western Railway from Lujan to Buenos Aires (Once) as stated previously. This arrangement was in operation up to the year 1894, when the Central Argentine Railway effected a connection with the ex-Northern Railway of Buenos Ayres, by the construction of a line between Victoria and Vagues, the latter point being the name of the junction with the original Pergamino-Lujan line. In consequence of the new construction, the traffic of the Central Argentine Railway was diverted to the Central Station of the ex-Northern Railway in Buenos Aires.

In 1902 arose the question of the amalgamation of the Central Argentine and Buenos Ayres & Rosario Railways. The amalgamation, however, was not officially sanctioned by the Argentine Government until 1907, when the Central Argentine Railway, which was the name adopted by the amalgamated companies, took over the old Buenos Ayres & Rosario Railway station in Buenos Aires. This station was situated in close proximity to the old Central Station. In 1909, however, with a view to co-ordinating the work of the two stations, which were both out of date, and inadequate to deal with increasing traffic, it was decided to abolish the Central and Rosario stations, and build one large terminus, which is now known as Retiro.

As regards the construction of the new Retiro terminus, the foundation stone of the existing edifice was laid on June 9, 1909, by Doctor José Figueroa Alcorta, then President of the Argentine Republic, in the presence of a large number of dignitaries of the country. The station was opened for public use on August 2, 1915. Although not yet completed in accordance with the original scheme, owing to the Great European War, it is anticipated that the final constructional work to complete the terminus will have to be carried out in the near future, owing to the tremendous increase in the traffic during recent years, and the heavy demands on the station in consequence thereof.

Retiro station can be divided into four parts, namely: Main entrance and carriage way, booking hall, grand hall, and platforms. For the sake of interest, it is well to describe the station under these headings. The main entrance and carriage way is particularly interesting, in that it is enclosed in glass on one side, the other side giving access to a very fine booking hall, 200 ft. long, 59 ft. wide, and 65 ft. high to a vaulted ceiling, terminating in the central dome of the station. Around the entire booking hall, at a height of 33 ft. from the ground, extends a gallery. The booking office, which stands in a central position in the hall, has thirteen ticket-issuing windows, six of which are entirely given up for the issue of tickets for the suburban section, thereby minimising the congestion at the ticket windows during the busy periods of the day. At one end of the hall stands the luggage despatching office, while at the other end are the first-class waiting rooms. Adjacent to the booking hall is the palatial grand hall and circulating area, which is one of the features of the terminus, measuring 479 ft. long, 82 ft. wide and 62 ft. high. Leading into the grand hall are the refreshment and dining rooms, the latter having staircases giving access to private dining rooms, with balconies overlooking the main dining hall. At one end of the grand hall are

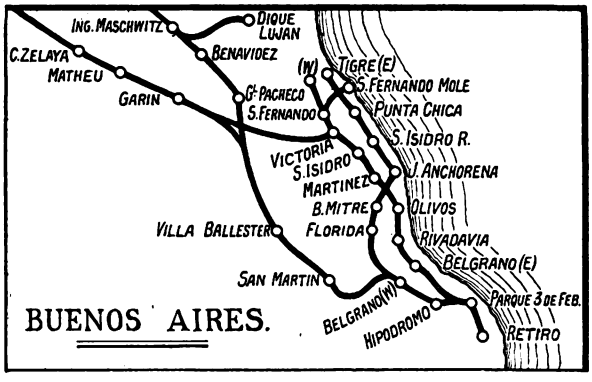
Digitized by Google



PLAN OF RETIRO STATION.

Digitized by Google

situated the offices of the divisional traffic superintendent, stationmaster's office, luggage receiving office and cloak room, hairdressing saloon, bathrooms, lavatories and second-class waiting rooms. A telegraph and telephone office also has access to the grand hall, while there is a post office in the station buildings, with an entrance facing the Avenida Maipú. It should also be mentioned that the railway company have extensive offices in the station.



MAP OF CENTRAL ARGENTINE SUBURBAN LINES IN BUENOS AIRES.

Other features of the grand hall are an up-to-date platform and train indicator, combined with an inquiry and second stationmaster's office, where supervision over all passenger-train traffic between the Retiro terminus and Maldonado Junction is established, fruit and provision stall, and a well-equipped bookstall catering for several different nationalities. Mention should also be made of a season ticket and inquiry office situated at the main entrance of the station, adjoining the carriage way.

So far as ornamentation is concerned, the booking and grand halls have been very tastefully designed, the lower parts of both halls being finished off to a height of about 7 ft. with specially imported Doulton faience of light olive green tint. The walls and columns above this height are embellished in imitation stone, and the ceilings designed with Paris plaster mouldings, while the floors of both halls are laid with mosaic.

Leading from the grand hall are eight spacious platforms, Nos. 1, 2, and 3 being 383 yards long, while the remaining five platforms are 273 yards in length. An immense glass roof covers all the platforms, and measures 820 ft. long and 328 ft. wide, being divided into two spans, with a height of 82 ft. Each platform is provided with electric lifts and stairways giving access to an extensive subway, which connects up all platforms. It is interesting to note in the track layout of the terminus that each set of platform lines is provided with a centre refuge road and connecting points to permit "running round" movements, while all terminal lines in the station are provided with large hydraulic buffer stops. It should also be mentioned that all the centre refuge roads in the terminus are equipped with inspection pits for the examination of locomotive and coaching stock should necessity arise.

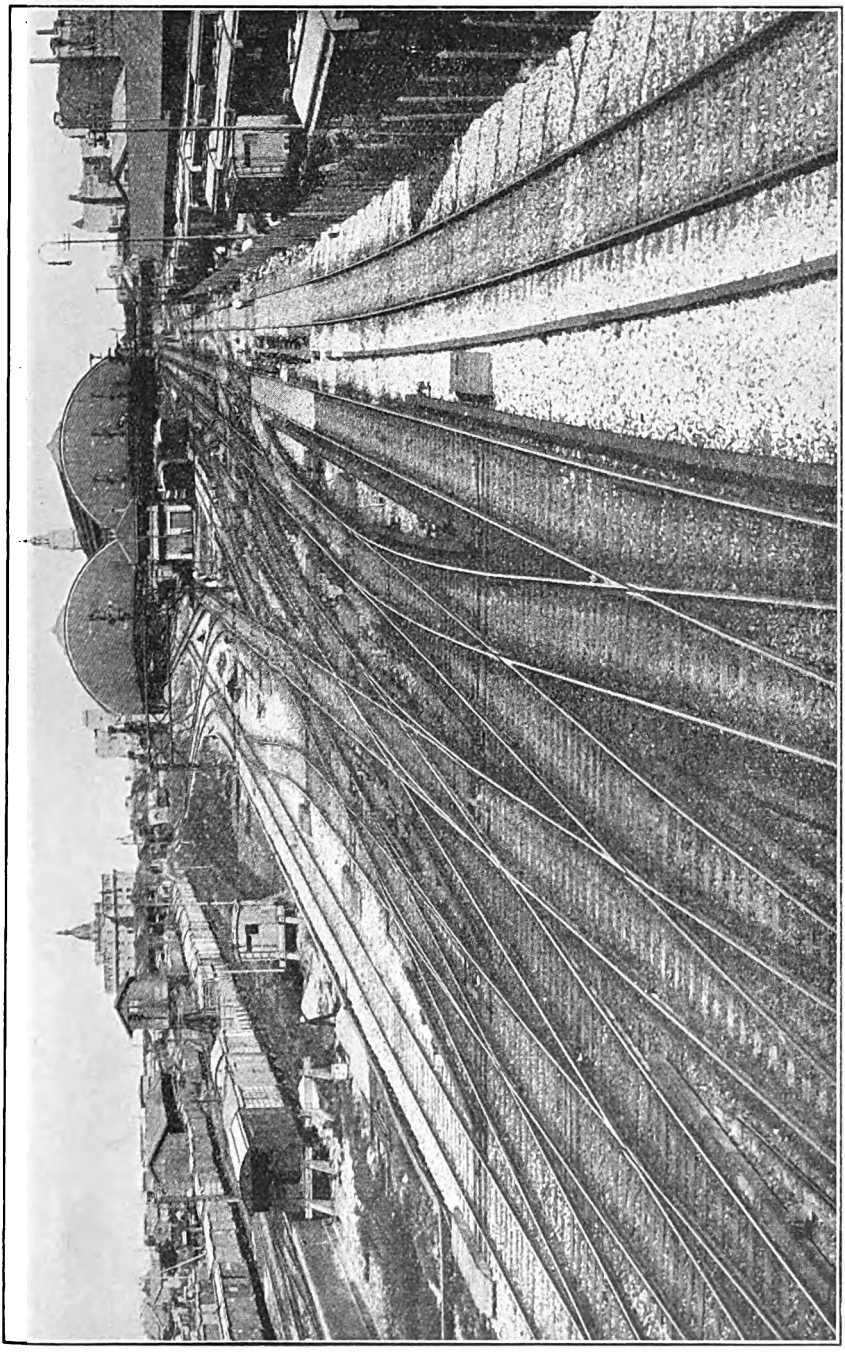
The allocation of traffic to the various platforms at Retiro may be summarised as follows :—Platforms 1 and 2, main-line trains (arrival and departure); platforms 3, 4, and 5, electric suburban trains; platforms 6, 7, and 8, steam suburban trains. The above is, of course, subject to alteration, especially during the "rush hours," when the flow of traffic is at its zenith, and therefore the allocation given must only be taken as a general rule.

At this point mention should be made of the very excellent and extensive electric and steam suburban service of the Central Argentine Railway in and around Buenos Aires, serving as it does some of the most popular and picturesque districts in the neighbourhood of the Argentine metropolis.

The electrified section, as stated previously, extends from Retiro to Tigre (Central), a distance of approximately 17 miles, the electrification of this line being inaugurated on August 24, 1916. All lines in the Retiro terminus are electrified, as well as the four tracks from Retiro to Maldonado Junction, a distance of just over 3 miles. The system of electrification employed is the "multiple unit," with third rail and direct current, 800 volts. Power is generated in the company's power house at Canal San Fernando, and is transmitted through underground cables to sub-stations at Olivos and Parque.

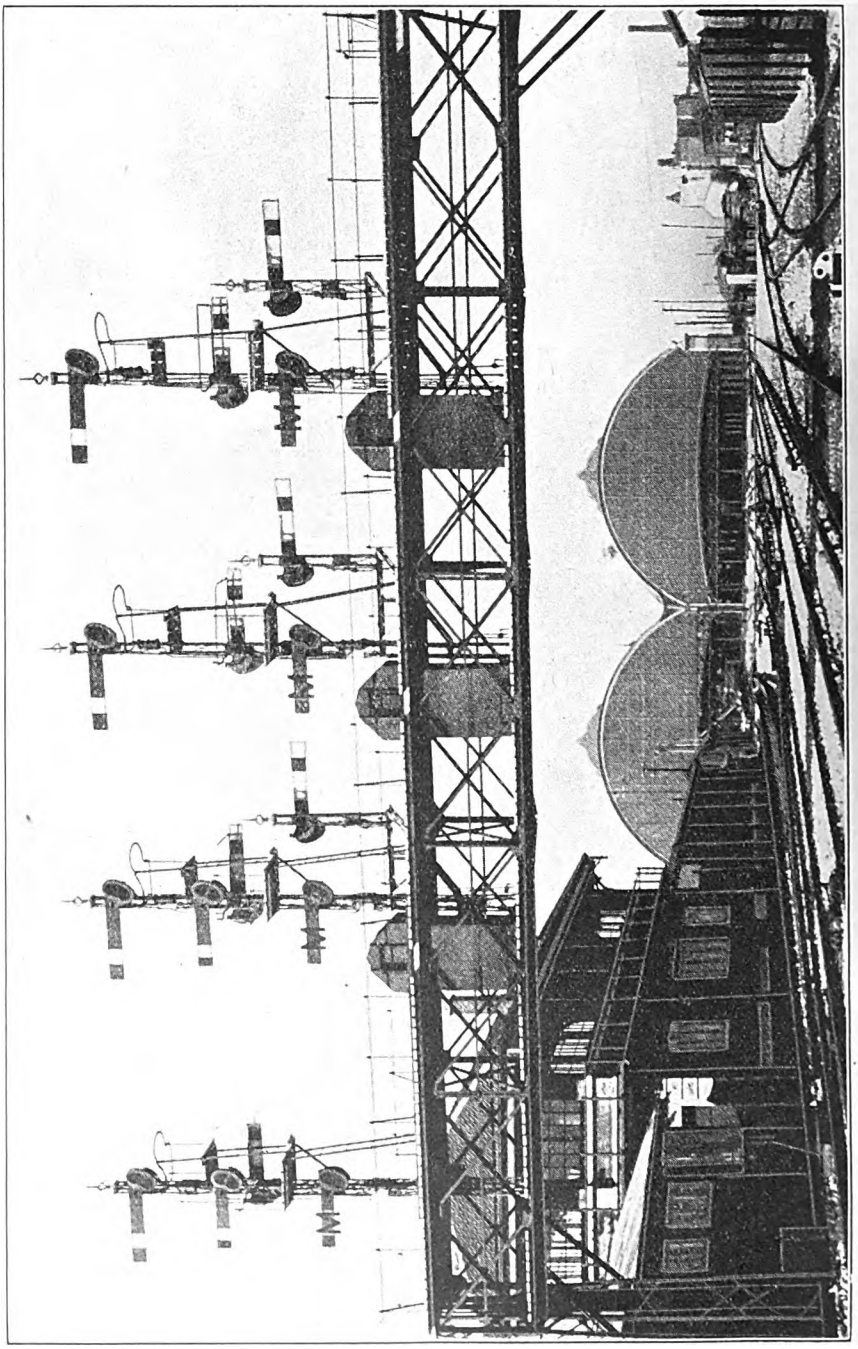
Digitized by Google

Digitized by Google



GENERAL VIEW OF APPROACH LINES AND CENTRAL ARGENTINE STATION.

Digitized by Google



SIGNAL CABIN AND SIGNAL BRIDGE OUTSIDE STATION.

Digitized by Google

Steam suburban services are operated as follows:—Retiro to Villa Ballester, situated 12½ miles from Buenos Aires on the main line to Rosario, and Retiro to Tigre (Rosario), a distance of approximately 20 miles, the latter line leaving the main line at Coghlan Junction, near Belgrano.

Tigre, situated on the River Lujan, is one of the most fashionable summer resorts round Buenos Aires. During the season regattas are held on the river by the leading yachting and rowing clubs, and these attract large numbers of people from all parts of the capital.

INTERIOR OF TRAIN SHED, PLATFORMS Nos. 3 AND 4.

As may be expected, the suburban traffic in and out of Retiro is particularly heavy during the "rush hours." On an average, the number of suburban trains in and out of the terminus, may be approximated as follows:—

Electric Services:—		
Weekdays	84	trains.
Sundays and Holidays, etc.	66	,,
Steam Services:—		
Weekdays	93	,,
Sundays and Holidays, etc.	75	,,

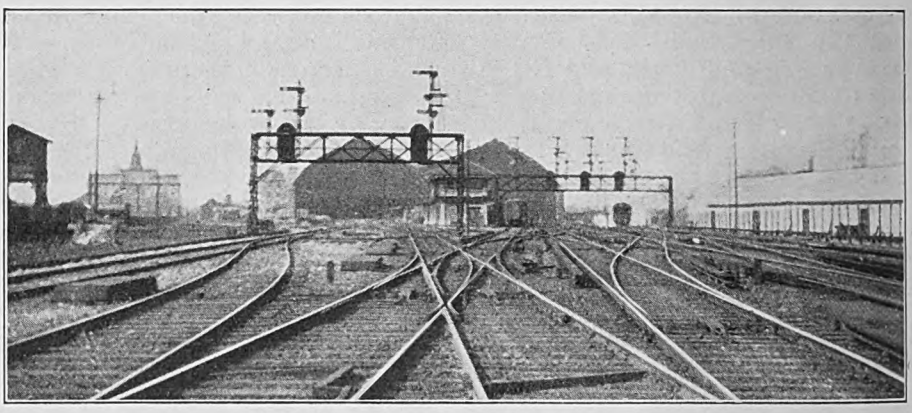
It may be mentioned that at the time of writing this article, arrangements are being made to electrify the Villa Ballester and Tigre (R.) suburban sections, and on the completion of this work all the suburban services of the Central Argentine Railway, in and around Buenos Aires will be electrically operated.

So far as the main-line traffic in and out of Retiro is concerned, the services are extensive and important, the Central Argentine Railway serving some of the most important provinces and commercial centres, in the central and northern parts of the republic.

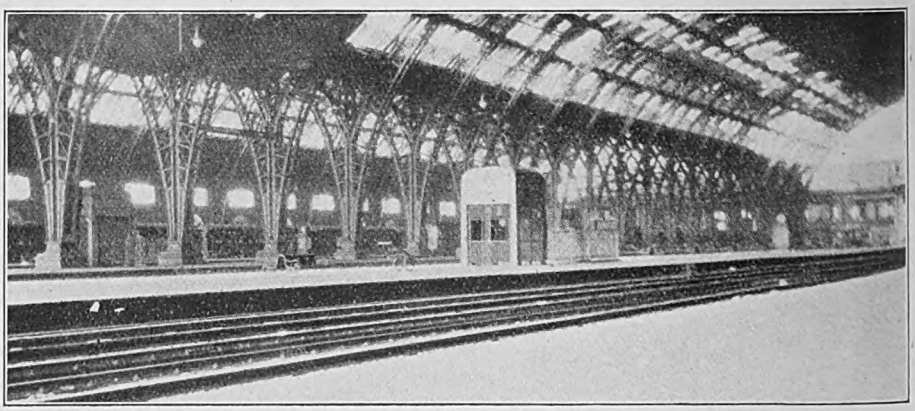
Among the towns in direct rail communication with Buenos Aires, mention should be made of Rosario, the second largest city in Argentina, Cordoba serving the beautiful hill country, and including the health and pleasure resort of Alta Gracia, where the railway company controls an up to date hotel, Santa Fé, Santiago del Estero, and Tucuman, noted for its warm climate, and where connection is made with the Argentine Central Northern Railway (State-owned) and the far-north sub-tropical provinces of Salta and Jujuy, the latter adjoining the Bolivian frontier.

Express trains with excellent dining, sleeping and saloon-car accommodation, are run from Buenos Aires (Retiro) to the above-mentioned points, and vice versa. The times occupied by the principal

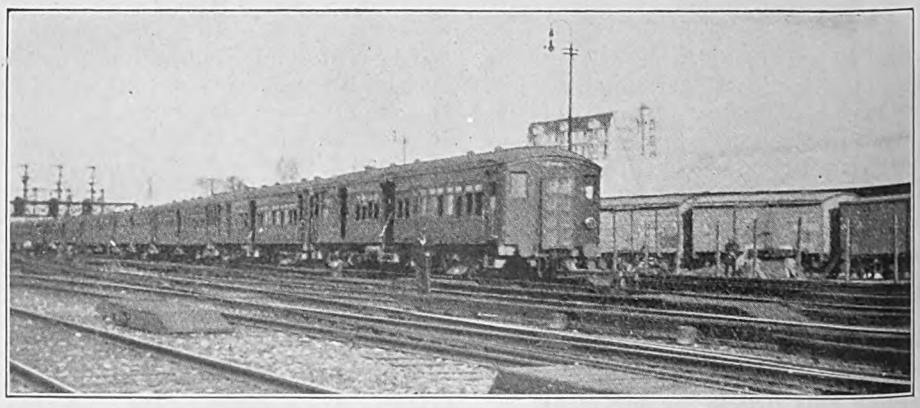
Digitized by Google



GENERAL VIEW, APPROACHING STATION.



INTERIOR OF STATION, PLATFORMS Nos. 7 AND 8.



ELECTRIC TRAIN LEAVING RETIRO STATION.

Photos.] [*H. R. Stones.*

Digitized by Google

trains are as follows: Rosario, 4½ hours; Cordoba, 12 hours; Santa Fé, 13 hours; Santiago del Estero, 21 hours; and Tucuman, 25 hours.

The main line arrivals and departures at Retiro may be summarised as follows:—

Arrivals.		Departures.	
Time.	From.	Time.	To.
a.m.		a.m.	
5.50	Rosario (Parcels).	7.0	Rosario.
6.20	Campana.	7.0	Rio Cuarto. WFO.
7.5	Rosario.	7.20	Rosario (via Pergamino).
7.55	Capilla del Señor.	8.0	Rosario. SuE.
8.45	San Pedro.	8.45	Zarate.
9.0	Cordoba.	10.0	Tucuman. FO.
9.45	Tucuman. ThSuO.	11.25	Capilla del Señor.
		p.m.	
10.55	Campana.	12.0	Rosario.
11.15	Pergamino.	12.50	Campana.
11.40	Zarate.	3.15	Zarate.
p.m.			
12.45	Rosario. SuE.	5.0	Tucuman. TuSO.
12.50	Rosario (*Season Excursion Sundays Only*).	5.5	Pergamino.
2.30	Rosario.	5.5	San Pedro.
5.46	Campana.	6.0	Campana.
6.15	Capilla del Señor.	6.40	Rosario (*Season Excursion Sundays Only*).
7.15	Rosario (via Pergamino).	6.45	Rosario. SuE.
7.38	Rosario. SuO.	6.50	Capilla del Señor.
7.50	Rosario. SuE.	7.0	Cordoba.
7.50	Tucuman. SuO.	7.5	Zarate.
9.45	Rio Cuarto. ThSO.	8.25	Rosario (Parcels).
10.10	Campana.	9.45	Rosario.
10.30	Rosario. SuE.		

NOTES.—FO. Fridays Only.
SuO. Sundays Only.
ThSuO. Thursdays and Sundays Only.
WFO. Wednesdays and Fridays Only.
SuE. Sundays Excepted.
ThSO. Thursdays and Saturdays Only.
TuSO. Tuesdays and Saturdays Only.

The "Crack Trains" of the Central Argentine Railway are the Rosario Expresses, leaving Retiro at 8 a.m. and 6.45 p.m., and in the reverse direction the 8.30-a.m. and the 6-p.m. from Rosario, giving arrivals in Retiro at 12.45 p.m. and 10.30 p.m. respectively. These trains are provided with dining and saloon car accommodation, and are very popular with business men, who are thus able to travel either to and from Buenos Aires or Rosario, and transact business in either city, in one day.

A few remarks may now be made on the signalling arrangements at Retiro. Traffic is controlled by three signal cabins, Nos. 1 and 2 cabins being equipped with electro-pneumatic installations for the operation of points and signals, the installations in each case being supplied by the British Power Signal Co. Ltd.

No. 1 cabin, with 173 miniature levers, is situated at the entrance to the terminus, and controls all movements in and out of the station. In this cabin is installed an indicator board, which works in conjunction with the track circuits, and shows the movements of all trains within the area under the control of the cabin. The cabin also controls the operation of a switchboard, which is situated at the head of each platform in the terminus, and operates the points, giving access to the centre refuge roads in the station for "running round" purposes.

No. 2 cabin, with 20 working miniature levers, is situated a short distance from the terminus, at the junction of the goods

Digitized by Google

Digitized by Google

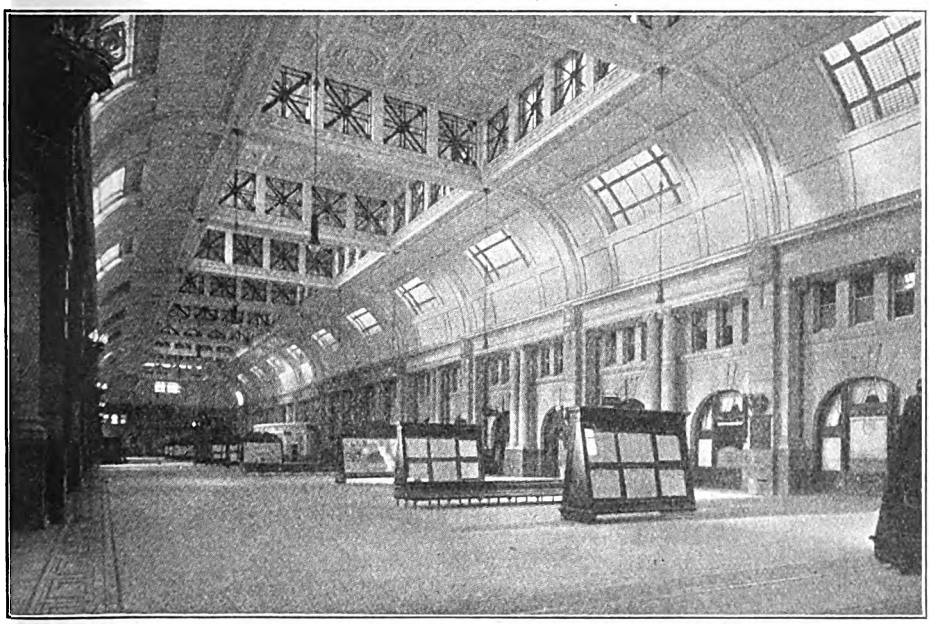
and passenger lines. This cabin controls all movements to and from the Retiro goods yard, in addition to all passenger train traffic, to and from Retiro passenger station. An indicator board showing the movements of trains on a given track-circuited area is also provided in the cabin.

It should be mentioned that both Nos. 1 and 2 cabins are provided with switch boards for cutting off the electric current locally, in the case of emergency.

No. 3 cabin, situated at the entrance to the Port lines, is not provided with an electro-pneumatic installation, the frame being of the ordinary manual type. The cabin has five working levers, and controls all interchange traffic between the Central Argentine Railway and the Port Railway of Buenos Aires.

All the cabins at Retiro are open continuously. In the case of Nos. 1 and 2 cabins, the hours of duty for the signalmen are arranged in three turns. Between the hours of 6 a.m. and 8 p.m. there are always three signalmen on duty in No. 1 cabin, with the assistance of a reliefman from 6 a.m. to 2 p.m., and 2 p.m. to 10 p.m. In No. 2 cabin one signalman is on duty for each turn, assistance being rendered by a reliefman from 7 a.m. to 11 a.m. and 4 p.m. to 8 p.m. So far as No. 3 cabin is concerned, the turns of duty are arranged between two signalmen.

As may be imagined, the staff at the Retiro terminus is large, the present complement numbering over 300 men. The station master is assisted by 1 assistant stationmaster, 5 second stationmasters, 3 regulating inspectors, 6 assistant regulating inspectors, 3 platform inspectors, 13 ticket examiners, 13 signalmen, and 142 other grades. The booking and parcels sections have each their respective chief, who in turn is responsible to the station master. The booking office staff numbers 15, while the parcels, luggage, and cloak room staff, consists of 4 parcels foreman, 78 parcels porters, and 48 clerical staff.



THE GRAND HALL.

Señor Juan Insua, stationmaster at the Retiro Terminus, has had a long and distinguished railway career covering some 35 years of service, in and around Buenos Aires. Born at Zarate in the Province of Buenos Aires on July 26, 1874, Señor Insua entered the service of the old Buenos Ayres & Rosario Railway Company, now amalgamated with the

Digitized by Google

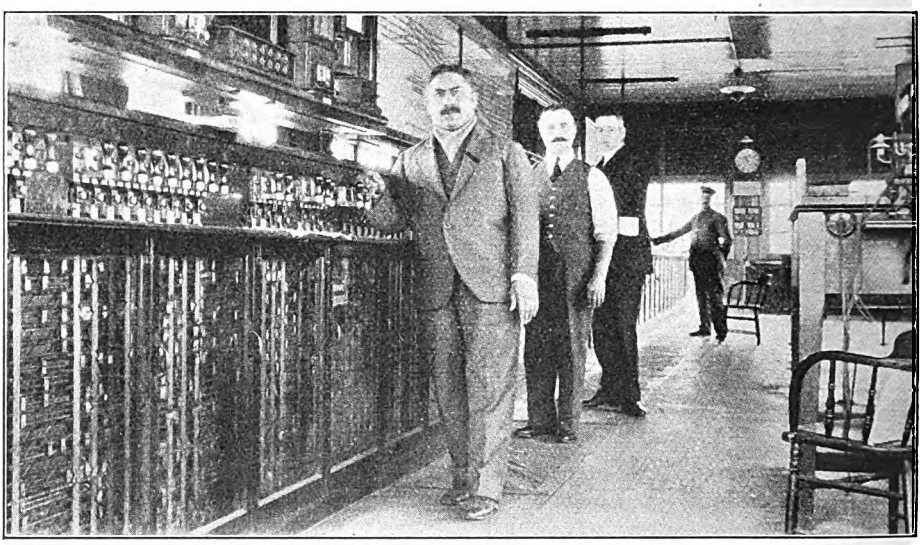
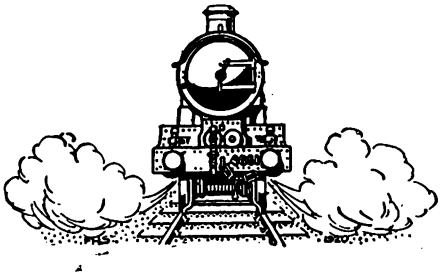


Photo.] [*H. R. Stones.*

INTERIOR VIEW OF No. 1 POWER SIGNAL CABIN.

Central Argentine Railway, in April 1892, as a Telegraph Clerk in the town of his birth. In November of the same year, he was promoted to the post of 2nd stationmaster at Zarate, being eventually appointed stationmaster at J. Anchorena on the Tigre (R) branch in August, 1894. Señor Insua later served in a similar capacity at Alsina, San Pedro, Campaña and San Martin, being appointed to the responsible position of stationmaster at Retiro in July, 1915, just a month prior to the existing terminus being put into public service.

In conclusion, the writer is much indebted to Mr. Camp, of the District Engineer's Office, Central Argentine Railway, San Martin, for the early history of the Central Argentine Railway, to Mr. G. B. F. Neele (now Assistant General Manager, Central Railway of Uruguay), and Señor Insua, stationmaster, for assistance and facilities kindly given in the compilation of this article.



Digitized by Google

Heavy Electric Traction in France. [No. I.]

By THEODORE RICH.

FRANCE has been well to the fore in the electrification of sections of its standard-gauge railways, and at present has in operation for through passenger and goods service two long stretches of main-line track.

Thirty years ago, when the Orleans Railway decided to build a new terminus on the Quai D'Orsay near the centre of Paris by an extension of their line from the Austerlitz station through a double-track subway along the banks of the Seine, electric traction was adopted for this final section, and what were for that date powerful electric locomotives were set to work for this duty.

About the same time congestion became a problem on the Paris suburban section of the Western Railway (now the Western State Railway), and a commencement was made by the electrification of the Invalides-Versailles line, where a long tunnel on a steep up grade had been a great obstacle to traffic owing to the smoke difficulty.

Before the war the Midi Railway, a line not so well known to tourists as its facilities and enterprise would deserve, which deals with an area between Bordeaux and the Spanish frontier and a strip of territory stretching from the southern Bay of Biscay to the Mediterranean, decided to utilise some of the water power existing in their area. One of the reasons for this policy was to avoid as far as possible dependence on foreign or long-distance rail-borne coal. A commencement was made by the electrification of several branches into the highlands, aggregating 60 miles; the results were so successful that it was decided to take in hand the main line southward from Bordeaux. The system then adopted was single-phase, 16 periods, at 12,000 volts.

During the war the coal problem became acute in France, and the question of the better utilisation of water power was taken up with vigour by the Government and the electrical community. It was decided to press forward the electrification of railways in the south, centre and east of France, where water power was available, and to adopt such a system as would best fit in with the supplies of electricity for general industrial purposes. In 1920, after much discussion, it was decided to make direct current a standard for new main-line railway electrification, with a normal pressure of 1,500 volts and an exceptional pressure of 3,000 volts. The system adopted by the Midi Railway was therefore changed from single-phase to high-tension direct current, and the branches already electrified on the former system are now being gradually changed to the latter. Two other companies, the Orleans and the Paris-Lyons-Mediterranean, have taken up the question; the former has electrified a stretch of main line from Paris to the south of Orleans, and the latter is conducting experiments on their very difficult Modane (Mont Cenis) section.

The railways in France, with the exception of the Western State Railway, are owned by companies, but, owing to social movements and the extreme difficulties arising out of the war, the companies are to a material extent under Government control and guarantee. Owing to the financial difficulties arising largely from commitments in the devastated area that Germany was not required to pay for by the Allies, the electrification of railways has not proceeded as fast as intended, but the great improvements in French credit resulting from the firm policy of M. Poincaré, will undoubtedly lead to more rapid development in the near future. The Nord and Est companies have not started any electric traction, although there is little doubt, as with the London local lines of the L.N.E.R. at home, that some suburban sections will have to be electrified before long.

The Western State Suburban System.

There is a tendency for big towns to extend towards the setting sun; Paris is no exception. The Frenchman is, by nature, an agriculturalist and takes to gardening; this has created a demand for housing in semi-rural areas and has led

Digitized by Google

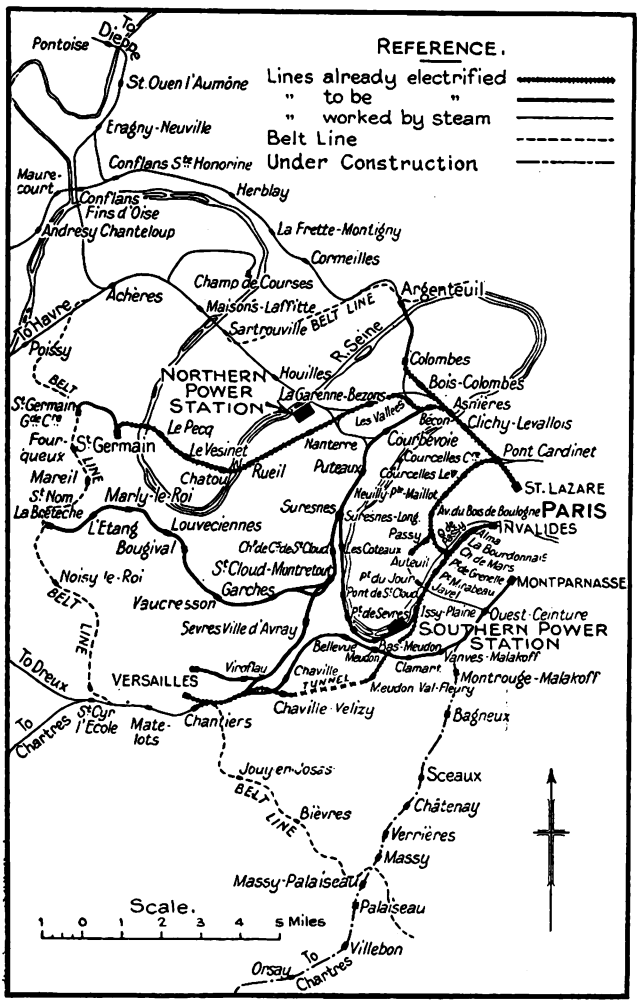


FIG. 1.—MAP SHOWING ELECTRIFIED AND OTHER RAILWAYS IN PARIS DISTRICT.

(Reproduced from "The Electrician.")

to an increase in suburban traffic. Fig. 1 shows a plan of the suburban area. This differentiates those sections already electrified, and those being transformed or forming part of the programme. This section is at present operated with direct current at 650 volts, although some of the new locomotives are arranged so that they can also run at 1,500 volts, should long distance sections be electrified at the French standard voltage.

There are three terminal stations in Paris belonging to the State Railway: St. Lazare, the largest which has 27 platforms and deals with the northern suburban area and the main-line traffic from Dieppe, Havre, and Rouen; the underground Invalides station which, besides a large traffic on the Versailles line has a certain amount of longer distance traffic; and Montparnasse, which deals mainly with long-distance traffic from South Normandy, Brittany and the south-west coast.

At the first of these the traffic during the rush hours reaches 50,000 an hour, or a quarter of a million passengers a day. It should be noted that in France the luncheon period is for two hours, office hours beginning earlier than with us; many people therefore go home to lunch, even when they live in the closer suburban areas, and this augments the middle-day traffic and means that season-ticket holders get more value for their money.

As also on the Est system, a great deal of the non-electrified suburban traffic is still carried on with quaint old-world double-storey four-wheeled coaches.

The electric traffic to Versailles (Rive Gauche) station is very heavy, particularly on Sundays and fête days in the summer, and in order to keep steam trains out of the Meudon tunnel, a number of long-distance passenger trains from the Invalides station, also goods trains from the riverside Champ de Mars goods stations, are being hauled as far as the Chantiers main-line station at Versailles by means of powerful electric locomotives designed and constructed by the Société d'Etudes pour l'Electrification des Chemins de Fer Francais. Each locomotive has four axles, each axle being equipped with an enlarged tramway-type motor of 275 h.p.; the length of the locomotive is 36 ft. 1 in., it weighs 59 tons. (Fig. 2.)

The passenger cars are of the all-steel

Digitized by Google

type, the large Continental loading gauge allowing them to be very roomy, they are painted a pleasant shade of dark green outside and are enamelled white inside, with distinctive colouring round the entrances for first and second-class, the third-class being done away with on electrified trains. Fig. 3 shows one type.

The motor cars and trailers are fitted with luggage racks, a matter of convenience with suburban traffic that our Underground railways might well follow. The cars seat about 80 passengers each and they have standing room for a further 100. The current is supplied by a third rail, the contact being made with a side suspended shoe. The third rail is supported on a cast-iron chair insulated by being supported on an impregnated wood block. (Fig. 4.)

Power is obtained partly from stations built for the purposes of the electrification and partly from a public supply. The substations are built of a buff brick, unlike so many such structures they are of pleasing design. Most of the substation machinery is of the rotary converter type, although on the Meudon tunnel section, to assist in the carrying of the heavy loads due to the long up-grade, a Brown-Boveri mercury vapour rectifier has been installed.

Fig. 5 shows the station and car shed at Bois Colombes. Fig. 6 shows a type of light signal developed by the Compagnie de Signalisation of Paris.

The Midi System.

The Midi Company was the first railway in France to take up seriously the question of long-distance electric traction. It takes over at Bordeaux from the Orleans Company the heavy international traffic from Paris to the Spanish frontier at Hendaye, and it has a big traffic all the year round to Biarritz, a seaside resort popularised by King Edward VII, which enjoys a mild climate and attractive bathing facilities. Branching off at Dax, a line runs to Toulouse and to Narbonne and Perpignan, touching Carcasonne, which has some of the most remarkable old fortifications in Europe. This section of line has numerous branches running up into the Perpignan, the company serving a strip of country about 200 miles long, from sea to sea, by about 75 miles broad.

From Bordeaux to Dax, the line runs for mile after mile through nearly level sandy country covered with pine forests, the district having been reclaimed from a mere sandy waste under the old French Monarchy; this was one of the many lasting public works carried out under the régime of the much-abused French kings. The area served by the line is mainly agricultural although Toulouse (at which place connection is made to the Orleans Railway) since 1914, has developed rapidly as a manufacturing centre, and a considerable engineering business has grown up at Tarbes.

A very large Pilgrim traffic from many parts of Catholic Western Europe is conducted to Lourdes, where a number of

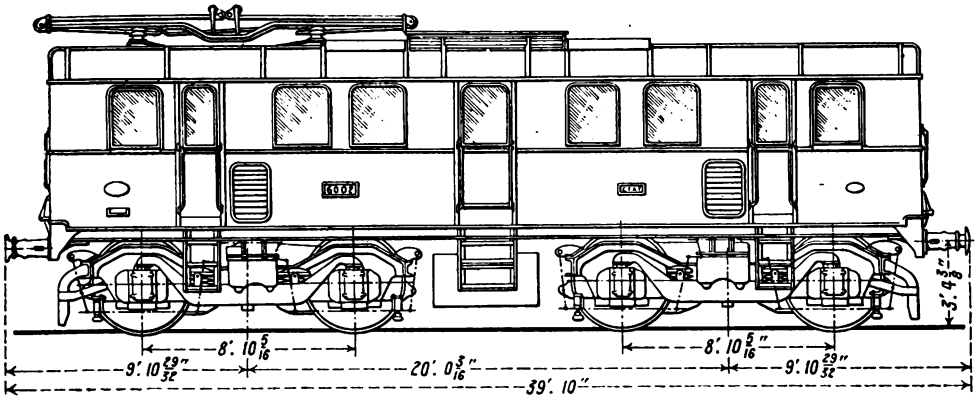


FIG. 2.—ELECTRIC LOCOMOTIVE FOR THE VERSAILLES LINE.

Digitized by Google

Digitized by Google

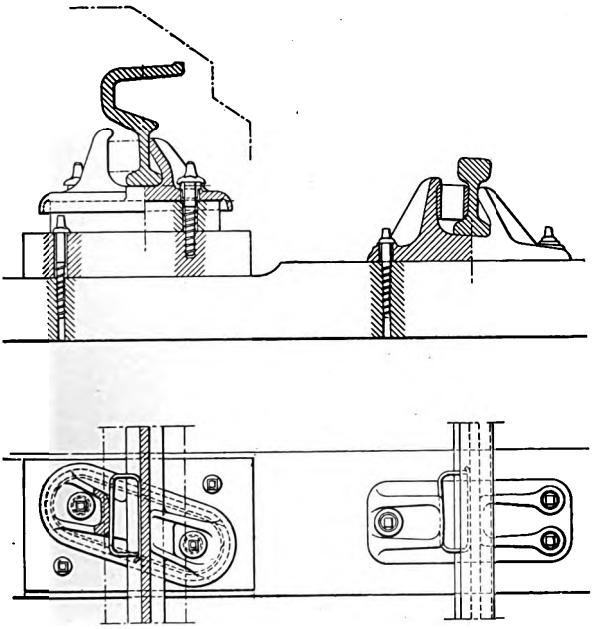


FIG. 4.—INSULATOR SUPPORT FOR THIRD RAIL.

sidings have been arranged for the numerous pilgrim specials.

In view of the fact that the Pyrenees have been to a large extent unspoiled, it is remarkable how little many of the health resorts such as Pau, Cauterets, Eau-Bonnes, St. Jean Pied-de-Port, and Font Romea are known to British people. The mountains are rugged and picturesque, the train service from Paris is good, and a service of motor cars has been organised through the mountain regions from West to East; the cost of hotel accommodation is reasonable. The main line so far electrified starts at Bordeaux, runs south to Dax and then east through Pau, Lourdes, and Tarbes to Toulouse. On the central section there are very heavy grades, including a stretch of 7 miles at 1 in 30, the electric locomotive hauling a heavy train over it in 13 min. as against 34 min. with a steam locomotive. The programme for electrification on the Midi railway covers a total of 2,000 miles.

In order to make the maximum use of the water power in the Pyrenees, a special power company was formed, which by means of co-operation between a number of owners and concessionnaires of water power stations and water falls, not merely is it possible to give a supply of electricity to the Midi Railway but also to a number of towns and villages along the line, and to supply power and especially seasonal surplus power to electro-chemical works. Power is generated at Soulom 21,000 H.P., Eget 35,000 H.P. to the south of Lourdes and 130,000 H.P. is under development in the Osseau Valley, two out of three power stations being at present at work. Fig. 8 shows the inside of the power station at Hourat, situated in a gorge amid pine forests, the building is of armoured concrete. A new route into Spain is nearing completion through the

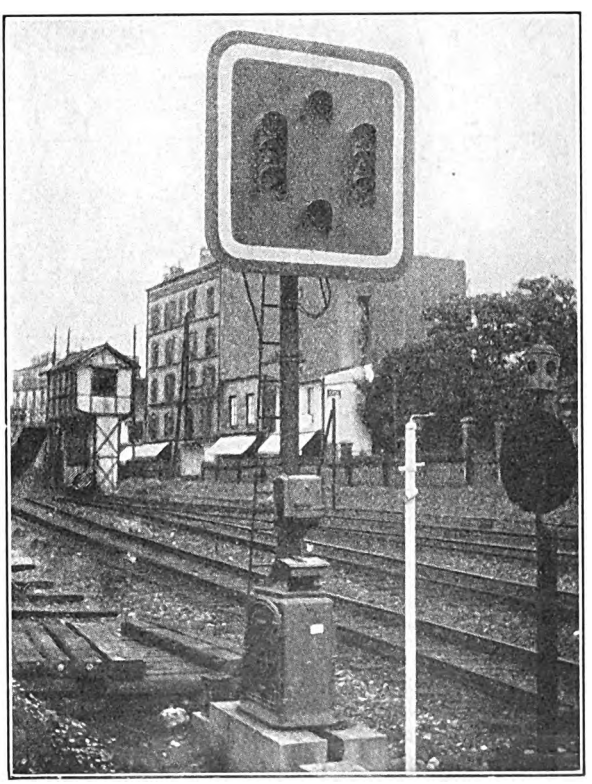


FIG. 6.—SPECIAL DESIGN OF LIGHT SIGNAL.

Digitized by Google

Pyrenees to the South of Pau, *via* Bedous.

The power station at Soulom mentioned above is on the road to Gavarnie, a world-renowned tourist attraction, a basin almost surrounded by wild mountains reaching to nearly 11,000 ft., close to the Spanish frontier. There are also two power stations at work in the Eastern Pyrenees, near Ax-les-Thermes, close to the tiny old-world republic of Andorra, operating local branches It might be noted that the Midi Company owns a narrow-gauge branch from Villefranche-de-Conflent to Bourg Madame, on the Mediterranean side, which reaches an altitude of 5,000 ft. with gradients of 1 in 16–6; this line is operated with direct current at 850 volts.

The current at the different power stations is generated at 11,000 volts and stepped up to 60,000 and 160,000 volts, the latter being for the long-distance transmission lines, the two step-up stations for the higher voltage being at Laruns and Lannemezan, with step-down stations at Toulouse, Dax and Bordeaux. Fig. 9 shows the substation at Dax. Sub-stations which tap off the 60,000-volt line are placed at intervals of eight to 20 miles, depending on the grades and traffic. Some of the sub-stations are equipped with rotary converters and some with Brown-Boveri mercury-vapour rectifiers for the supply of direct current to the overhead trolley line at 1,500 volts.

The main line at 150,000 volts goes cross country except in the stretch from Bordeaux to Dax through the forests, where it is placed alongside the railway to avoid having to cut down a second right-

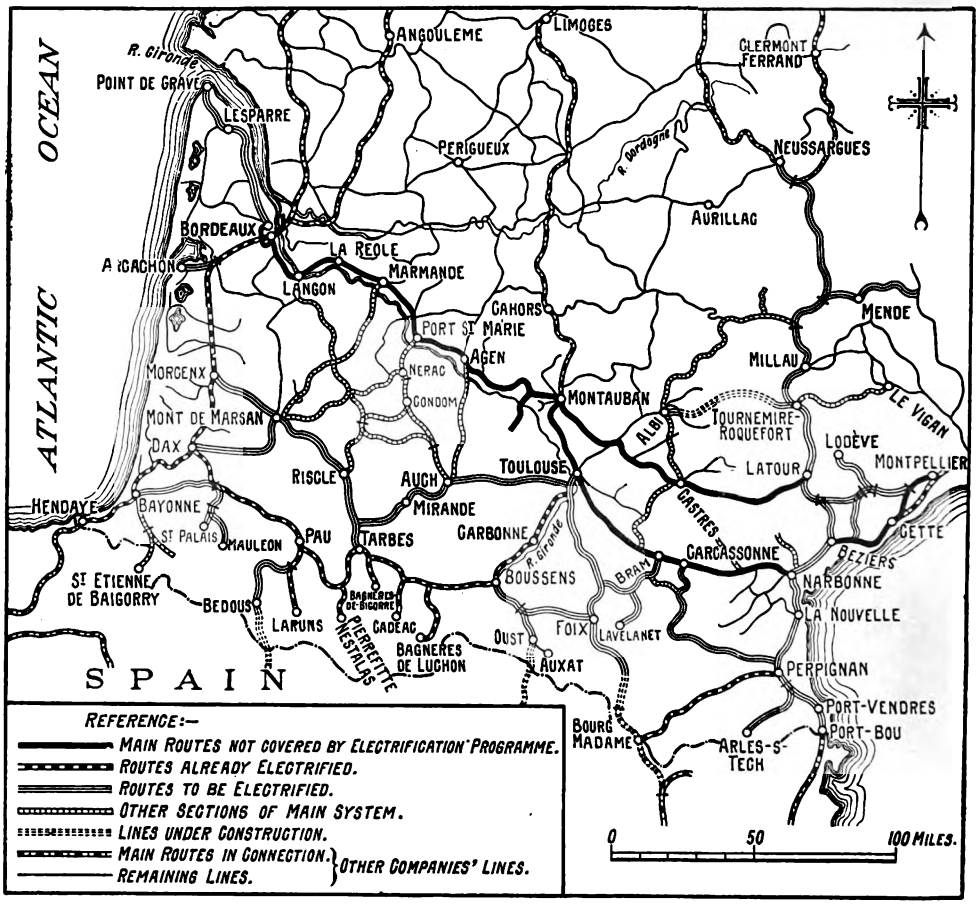


FIG. 7.—MAP OF MIDI SYSTEM, SHOWING LINES ELECTRIFIED OR TO BE ELECTRIFIED.

Digitized by Google

Digitized by Google

of-way. There is one point of interest, in the past owing to carelessness and even incendiarism great damage has been done to the forest in parts near the line, and the blame has been put again and again on sparks from steam locomotives. The use of electric traction on the stretch Bordeaux to Dax will largely justify itself apart from other factors, by the reduction of such claims. A line at 11,000 volts also runs along the track to supply light and power to railway stations and villages.

(*To be continued.*)

New 4-6-2 Locomotives, Queensland Government Railways.

IN order to meet passenger service demands on the main line from Brisbane to the northern parts of the State, a new type of passenger locomotive has recently been introduced on the Queensland Government Railways. The engine is of the 4-6-2 type and was constructed at the Ipswich Railway Workshops from designs prepared by the Chief Mechanical Engineer, Mr. R. J. Chalmers, and his staff. Special consideration has been given in the design to operating conditions in Queensland, particularly with regard to the 3-ft. 6-in. gauge and its restrictions on dimensions and weights.

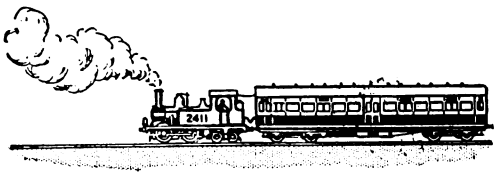
The boiler is of the wide firebox design, having sloping back and throat plates, and conical barrel fitted with copper firebox and copper-coated steel tubes 2 in. in diameter. The boiler is fitted with three 3-in. safety valves, set at a working pressure of 160 lb. per square inch. It is equipped with an M.L.S. 21-element superheater and inside admission piston valves. Top feed from the injectors has been introduced for the first time.

The valve motion is of the Walschaert type and designed to afford maximum accessibility and convenience in repairs. Weights on the coupled wheels are compensated, and further compensation is provided between the rear coupled wheels and the pony truck. Attached to the locomotive is an eight-wheeled standard tender of 3,000 gallons capacity for water, and 4½ tons of coal.

Principal dimensions are as follow :—

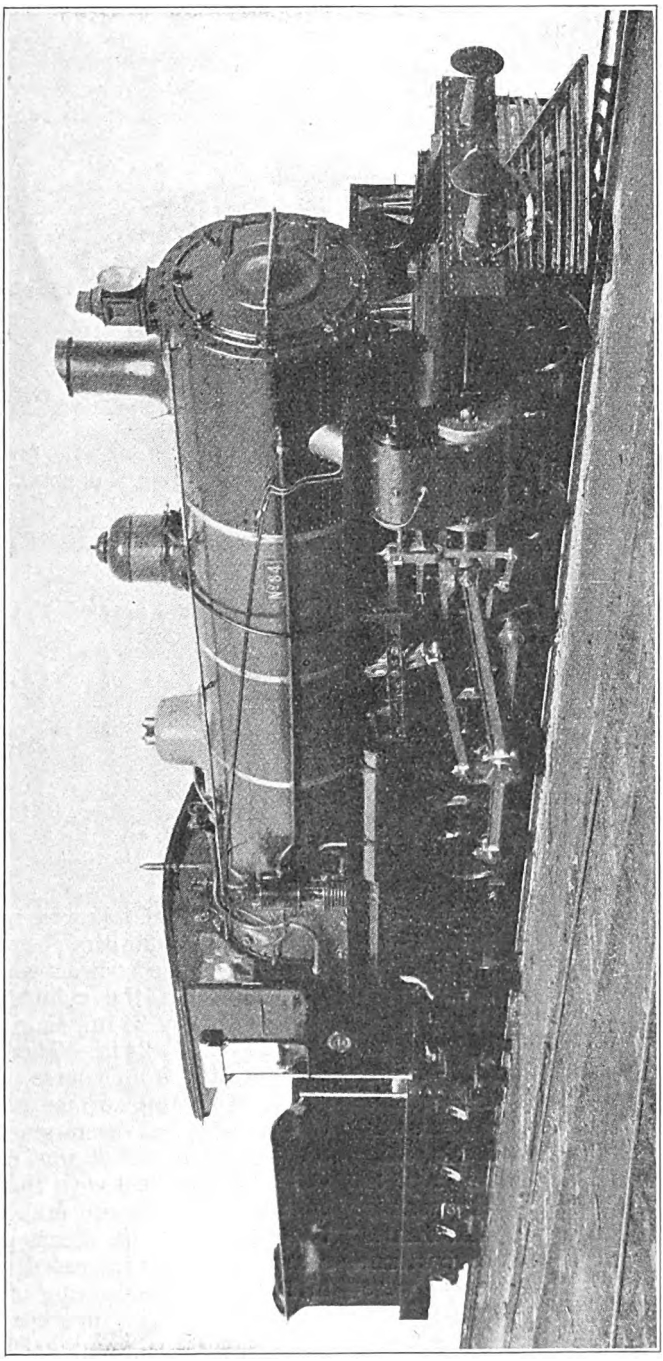
Gauge	3 ft. 6 in.
Cylinders	18¼ in. by 24 in.
Wheels, coupled, diam. ..	4 ft. 3 in.
,, truck, front, diam.	2 ft. 4 in.
,, ,, rear, diam.	2 ft. 4 in.
Heating surface :—	
Tubes	1,512 sq. ft.
Firebox	106 ,,
Elements	339 ,,
Total	1,957 ,,
Grate area	25·3 ,,
Working pressure	160 lb. per sq. in.
Tractive force	20,060 lb.
Total weight	56 tons 7 cwt.
Weight of tender, empty	15 tons 10 cwt.
,, ,, running order	33 tons 8 cwt.
Total weight of engine and tender in running order ..	89 tons 15 cwt.

This locomotive is in the nature of an experiment, and should it prove satisfactory it is hoped to further improve the hauling capacity by the introduction of a locomotive booster on the pony truck, to enable it to handle heavier loads on the mountain ranges.



Digitized by Google

NEW 4-6-2 LOCOMOTIVES, QUEENSLAND GOVERNMENT RAILWAYS.



THIS DESIGN INCLUDES MANY SPECIAL FEATURES, AND PROVIDES A POWERFUL CLASS OF ENGINE FOR USE ON 3-FT. 6-IN. GAUGE LINES WITH HEAVY GRADES.

(See description on opposite page.)

Digitized by Google

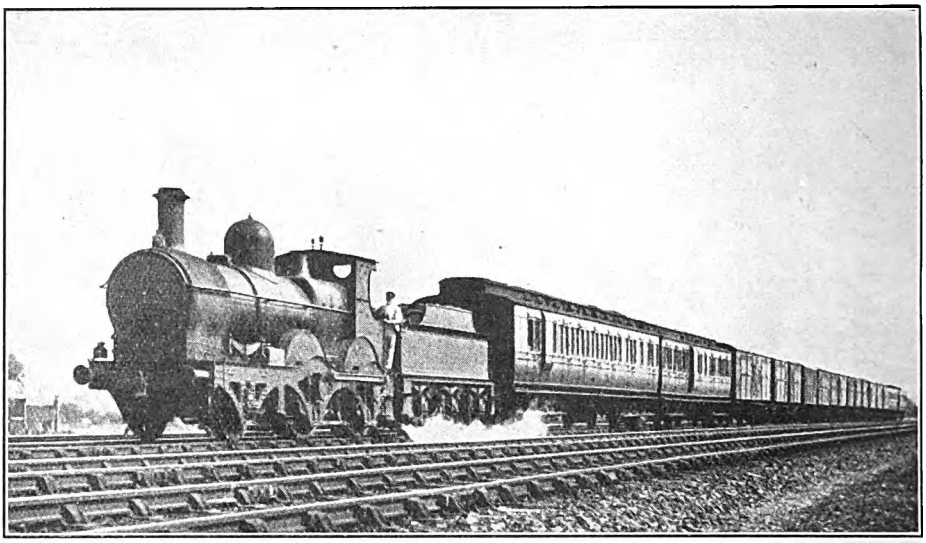


Photo.] [*M. W. Earley*

2-4-0 LOCOMOTIVE No. 3219 (REBUILT) ON HORSE-BOX SPECIAL.

Modern Locomotive Practice on the Great Western Railway. [No. II.]

By F. W. BREWER, A.I.Loco.E.

SIX other passenger 2-4-0 engines with 6-ft. 2-in. wheels were also turned out in 1889, in this case at Wolverhampton. They were numbered 3226—3231, and had raised fireboxes and ordinary slab outside frames. They were comparatively small engines, with 17-in. by 24-in. cylinders, 1,263·5 sq. ft. of heating surface, and 150 lb. per sq. in. pressure. Their weight in working order was 36 tons 11 cwt. In 1912, No. 3228 was fitted with a Belpaire firebox, and the heating surface became 1,141·71 sq. ft., but the steam pressure was not increased. As thus altered, No. 3228 weighed 35 tons and had the later type of tender weighing 34¼ tons. The former tender weighed 29¼ tons, and had frames of the old broad gauge cut-out pattern. No engines of the "3226" class were superheated. They were scrapped as follows:—No. 3228 in 1914; No. 3229 in 1916; Nos. 3226 and 3227 in 1919; and Nos. 3230 and 3231 in 1922. Except that they had larger cylinders, modern boilers, and cabs, these engines were very similar to a class which came out in 1863.

In 1892, 10 additional engines of the modified "2201" inside-framed design were built. They were numbered 3232-3241, and were followed in 1893 by 10 more, their numbers being 3242–3251. The four-coupled wheels were 6 ft. 8½ in., as before, but the cylinders, instead of being 17 in. by 24 in., as in the "2201's," were 17½ in. by 24 in. The boilers had the dome on the front course, and had 1,364 sq. ft. of heating surface. The weight of the engines has been given as 34 tons 8 cwt., and also as 38 tons 6 cwt. A start was made in 1910 with the fitting of the engines with Belpaire fireboxes (No. 3249 being the first), the steam pressure at the same time being increased to 165 lb., and in 1924 the superheating of the class was commenced. The superheaters comprised six elements, containing 36 steam tubes. The total heating surface of the non-superheated Belpaire boilers was 1,157·38 sq. ft., and that of the superheated ones,

Digitized by Google

1,135·40 sq. ft., with a grate area of 15½ sq. ft. in each case. The domes of the new boilers were on the back ring. The engine weights were :—Non-superheated "Belpaires," 38 tons 18 cwt.; superheated, 40 tons 12 cwt. New 3,000-gallon tenders were provided; weight, 36¾ tons. Only seven of these engines are, or were, in service towards the end of 1926, viz., Nos. 3232, 3234, 3237, 3238, 3240, 3241 and 3251. The others were scrapped, as under :—

No.	Date Broken Up.
3243	Aug., 1918.
3248	Sept., 1923.
3249	Feb., 1925.
3250	,, ,,
3239	Mar., ,,
3233	Oct., ,,
3247	,, ,,
3235	Mar., 1926.
3244	Sept., ,,
3245	,, ,,
3246	,, ,,
3236	Oct., ,,
3242	,, ,,

It may be, of course, that others have since been withdrawn.

I have already mentioned that the G.W.R. had a number of tender engines with four-coupled wheels of the unusually small diameter of 5 ft. 2 in., nominally 5 ft. Apart from the five examples previously dealt with (Nos. 3201–3205, of 1885), there were, in fact, 60 others of later build, 20 being of the 2-4-0, and 40 of the 4-4-0 type. These 60 had originally been tank engines. The 2-4-0's were numbered 3,501–3,520, and the 4-4-0's, 3521–3560, the former being converted to the tender type in the years 1890 to 1895, and the latter in 1899 to 1902. The first-quoted 20 were formerly 2-4-0 side tank engines, built in 1885, and of these Nos. 3501–3510 were of the broad-gauge convertible kind, while Nos. 3511–3520 were standard-gauge engines. The broad-gauge 10 had inside frames for the coupled wheels, the narrow-gauge 10 outside frames for all the wheels. The cylinders in each class were 17 in. by 26 in., and the four-coupled wheels 5 ft. 1 in. The total heating surface was 1,209·86 sq. ft., the grate area, 15·2 sq. ft.; the working pressure, 140 lb.;

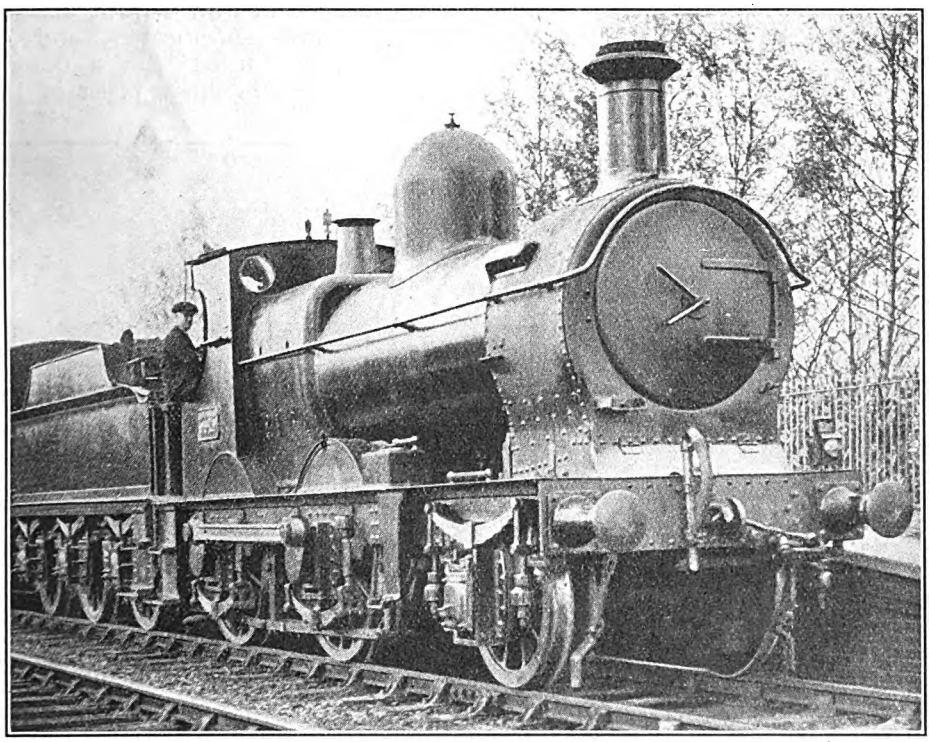
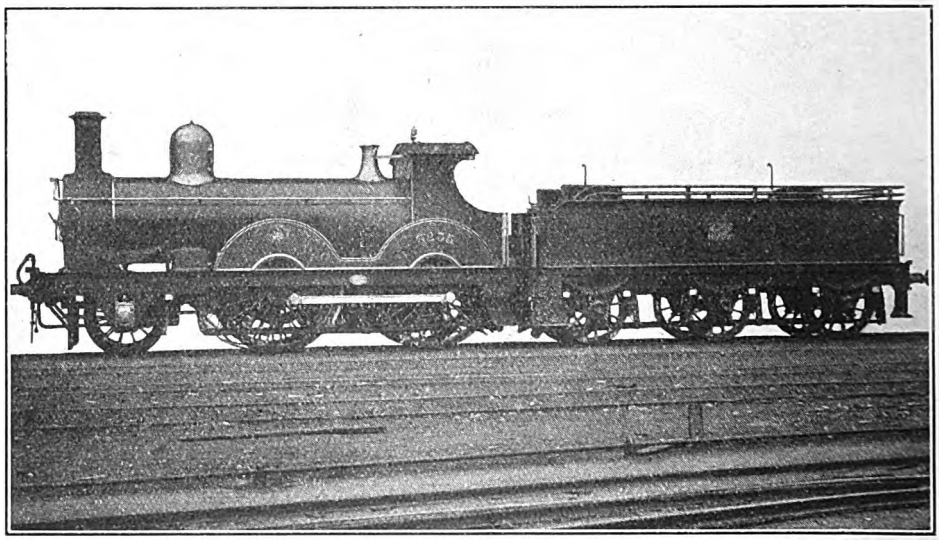


Photo.] SMALL-WHEELED 2-4-0 No. 3515. [*M. W. Earley.*

Digitized by Google

and the weight, 43 tons 3 cwt. Most or all of the standard-gauge engines were, for a time, equipped with condensing apparatus to enable them subsequently to work trains through the Severn tunnel. From information kindly supplied by Mr. Collett, four of the broad-gauge lot were altered to the 2-4-0 tender type in 1890, the numbers of these being 3,501, 3,502, 3,505 and 3,508. A fifth, No. 3507, was similarly altered in 1891. At least three of these engines (Nos. 3502, 3505 and 3508) were then broad-gauge tender engines with inside bearings only for the coupled wheels, and they were specially so rebuilt for the steep gradients of the South Devon line. I must confess that I was not previously aware that as many as five of the wider-gauge batch had been converted to tender engines prior to the abolition of that gauge. The remainder of the same batch, Nos. 3503, 3504, 3506, 3509 and 3510, became standard-gauge 2-4-0's in 1892. The three South Devon engines were, in due course, also adapted to the latter gauge. As regards the 10 2-4-0 tank engines which were constructed for the 4-ft. 8½-in. gauge, these reappeared as tender engines as follows:—Nos. 3511, 3513, 3515, 3516, 3517, 3518, 3519, 3520, in 1894; and Nos. 3512 and 3514 in 1895.

All of the foregoing 20 engines (Nos. 3501–20), as narrow-gauge tender 2-4-0's, had double frames, with the leading axle directly under the smoke-box, as in the "3201" class, with which engines the "3501's" corresponded in appearance. The cylinders were 17 in. by 26 in., and the coupled wheels were now 5 ft. 2 in. The heating surface and grate area remained practically the same as before, when the engines were tank engines, but the steam pressure was raised to 150 lb. Engines of the "3501" series, like the "3201's," have been rebuilt with Belpaire fireboxes, and also with superheaters, and one, No. 3514, was fitted with a domeless straight-barrelled Belpaire boiler in 1901. This boiler, however, was removed from the engine in 1906. The Belpaire and superheater boilers carried 180 lb. pressure, increasing the tractive effort from 15,450 lb. to 18,545 lb. The undernoted engines of this class have been cut up:—



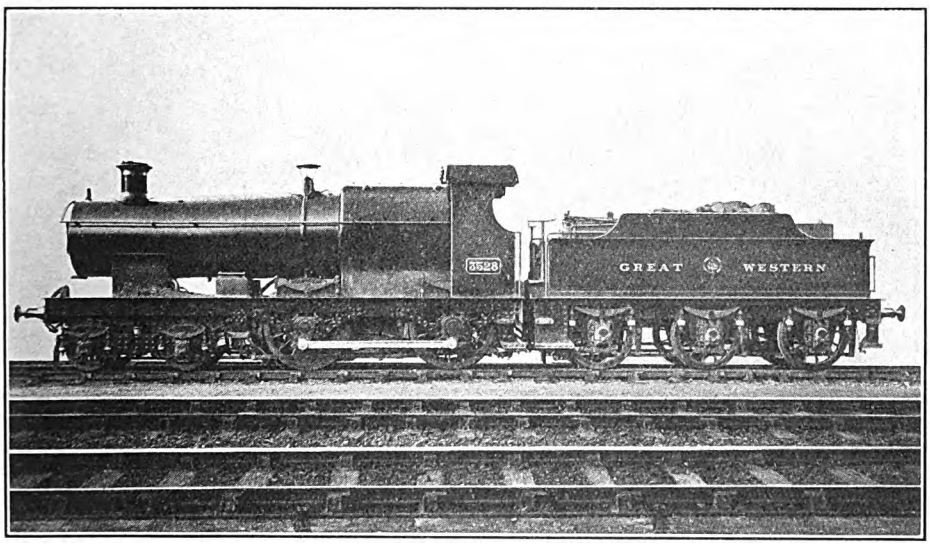
2-4-0 LOCOMOTIVE No. 3235 (3232–3251 CLASS).

No.	Date Scrapped.
3509	May, 1919.
3517	,, ,,
3520	,, ,,
3519	Mar., 1925.
3502	June, ,,
3504	Dec., ,,
3506	Sept., 1926.

The other noteworthy conversion, in this instance to the 4-4-0 tender variety, was that of the 40 tank engines numbered 3521–60. All of these were 0-4-2's except the last, No. 3560, which was

Digitized by Google

a 0-4-4 or trailing bogie tank engine. Twenty of the engines, Nos. 3521–40, had been constructed for the standard gauge in 1887–88, and these had long side tanks, and outside frames of the slotted "B.G." kind. The remaining 20 tank engines, Nos. 3541–60, were turned out in 1888–89 as broad-gauge "convertibles," with inside frames throughout, and all, with the exception of No. 3560, had saddle tanks and a single pair of trailing wheels. This particular engine had very short side tanks, and a trailing four-wheeled bogie, the wheels of which had outside frames gauge and fitted with similar tanks in place of the former saddle tanks. The whole series of 40 engines were also provided with outside-framed trailing bogies similar to the one put under No. 3560 when first built. The wheelbase of these bogies was only 4 ft. 6 in., which, it was said, helped to make the engines more or less unsteady when running fast, and it was possibly this characteristic which ultimately led to their being converted to tender engines. New frames were supplied, as the coupled wheelbase, previously 7 ft., was increased to 8 ft. 6 in., in order to make room for the firebox.



4-4-0 LOCOMOTIVE No. 3528 REBUILT WITH MODERN TAPER BOILER.

and bearings, and teak centres. Both the broad and narrow-gauge batches had 5-ft. 1-in. coupled wheels and 17-in. by 24-in. cylinders. The narrow-gauge engines weighed 47 tons 18 cwt. and had 1,194·6 sq. ft. of heating surface, a grate area of 18·9 sq. ft., and a boiler pressure, initially of 180 lb. but afterwards reduced to 160 lb. The weight in the case of the broad-gauge lot was 45 tons 12 cwt., and the total heating surface (the fireboxes being slightly smaller), 1,179·1 sq. ft., but the grate area was the same, 18·9 sq. ft. Subsequently the side tanks of the N.G. engines, Nos. 3521–3540, were shortened like those of No. 3560, and after the disappearance of the broad-gauge, Nos. 3541–59 were adapted to the present

As 4-4-0 tender engines Nos. 3521–60 all had double frames, 17-in. by 24-in. cylinders, 2-ft. 8-in. bogie wheels, and 5-ft. 2-in. driving wheels. Although nominally of one series, the 40 engines were sub-divided into two classes, consisting of 26 and 14 engines respectively, the former having domed, and the latter non-domed boilers. It should be noted, however, that the 14 examples of the last-mentioned class were not, contrary to what might be supposed, rebuilds of the domed series. They were constructed straight away with domeless parallel barrels, and raised Belpaire fireboxes. The 26 engines with domes were Nos. 3521, 3522, 3523, 3526, 3527, 3529, 3530, 3534, 3535, 3537, 3538, 3539, 3541, 3542, 3543,

Digitized by Google

3544, 3545, 3546, 3549, 3550, 3552, 3553, 3554, 3555, 3557 and 3560. The boilers first fitted to this batch had round-topped fireboxes, and the domes were at the front end of the barrels, The steam pressure was 150 lb., the grate area 18·9 sq. ft., and the heating surface 1,194·6 sq. ft. The weight of the engines was 41 tons 4 cwts., and that of the tenders (2,500 gallons) 34¼ tons. Most, if not all, of these engines were later re-boilered with Belpaire fireboxes, and with domes on the back rings. The heating surface was virtually unaltered, but the grate area was only 15·32 sq. ft. On the other hand, the steam pressure was raised to 180 lb. New 34¼-ton tenders were provided. These alterations were effected during 1902 to 1916, inclusive. Swindon type superheaters (six elements, 48 steam tubes) were first fitted in 1915. The engines with Belpaire fireboxes, whether superheated or not, weighed 41 tons 16 cwt. The following engines were broken up as under :—

3541	Oct.,	1913.
3530	Mar.,	1922.
3560	,,	1923.
3522	Jan.,	1924.
3542	Mar.,	1926.

I may add that Nos. 3521 and 3546 were sold to the Cambrian Railways Company in August, 1921, but were returned on the amalgamation of that company with the Great Western. Taper boilers were not fitted to this class.

The 14 engines of the other class, which differed from those just described in having domeless Belpaire boilers when turned out as 4–4–0 tender engines, had 1,561·65 sq. ft. of heating surface, 21·35 sq. ft. of grate area, and 180 lb. pressure. In this form, they weighed 45 tons. Their numbers were: 3524, 3525, 3528, 3531, 3532, 3533, 3536, 3540, 3547, 3548, 3551, 3556, 3558, and 3559. At a subsequent stage, engines of this batch were rebuilt with taper boilers having 1,425·68 sq. ft. of heating surface and 200 lb. pressure, and the weight was increased to 46 tons 3 cwt. Still later, most of the engines were equipped with 6-element, 36-steam tube superheaters. Three of the 14 engines have been scrapped: No. 3532 in March, 1923, No. 3558 in September of the same year, and No. 3536 in November, 1926.

With 180 lb. pressure, the engines of both classes had a tractive force of 17,120 lb., and those of the non-domed series which were rebuilt with 200 lb. had a tractive effort of 19,020 lb.

The foregoing sixty conversions from the tank to the tender type with 5-ft. wheels have been dealt with consecutively for the sake of convenience.

(*To be continued.*)

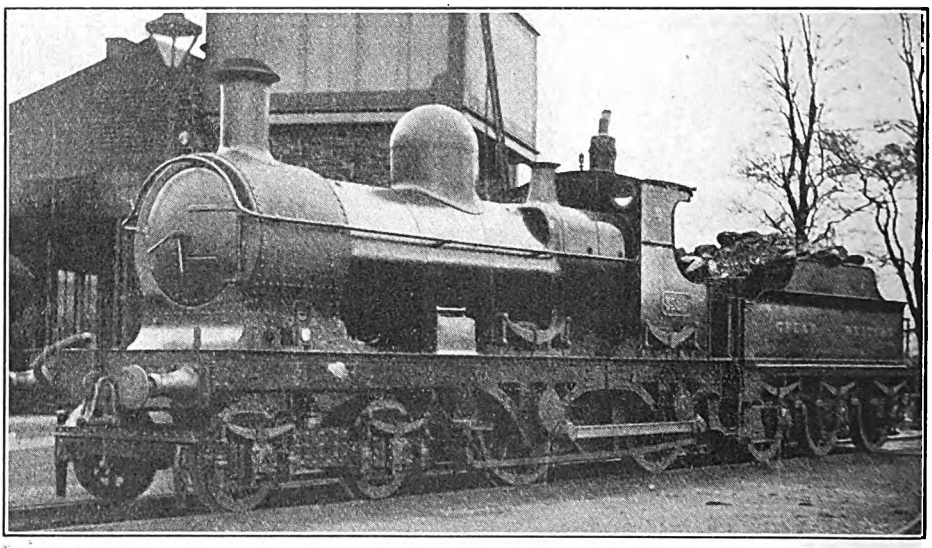


Photo.] [*R. H. Pincombe.*

4-4-0 No. 3529 AT BARNSTAPLE, AS FITTED WITH DOMED BOILER.

Digitized by Google

Railhead Distribution for Industrial Products.

AN important development of recent years is the extent to which firms are using depots or railway premises as centres for their local distribution, these centres being served by express freight-train facilities from and to the works or head-quarters of the firms in question. In most cases, use is made of containers of various types, while railway wagons suitably fitted, are allocated to the service. Two interesting examples are described, one on the L.N.E.R. and the other on the L.M.S.R.

L.N.E.R. Depot at Holloway.

The first is the railhead distributing depot which has been opened at Blundell Street, Holloway, for the handling of Messrs. Rowntree's products in the London area. This depot, which is located on premises belonging to the London & North Eastern Railway Company, has been opened by Messrs. Rowntree as a distributing depot, equipped on scientific principles, for the delivery of their products in the London and South Coast areas. Direct rail access is given to the premises, which have been specially equipped for the purpose in view, and which provide for the speedy delivery of the traffic.

Messrs. Rowntree's traffic for London and the south, which until recently was carried by road vehicles, is now being despatched in containers and conveyed in specially-equipped vans from their York factory station. These vans are fitted with adjustable bars which hold the containers in position and so avoid any damage to the contents that might arise in transit. The vans are conveyed on fast freight trains during the night, so that they arrive at the depot by the time work commences there, and thus enable deliveries to be made in London early the following morning by motor vehicles owned by Northern Motor Utilities, of York.

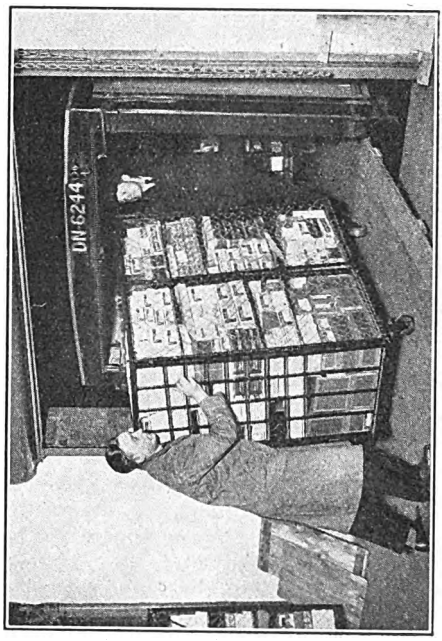
The method of handling is as follows: On the arrival of the vans at the depot unloading platforms, of which there are at present two, the adjustable bars are removed and the containers lifted by special jiggers on which they are conveyed to the hoist. This raises them to the distributing floor, where by means of the jiggers they are moved to any location required, and are thus in a position for prompt handling. The making up of orders can be effected at once, and as these, on being completed, are placed on trays, themselves carried in containers which are wheeled on to the motor vehicles as required, delivery can be effected very speedily.

Mr. W. M. Gracie, Assistant Goods Manager (Southern Area), London & North Eastern Railway, recently explaining this development from the railway point of view, stated that the inauguration of this London depot marks a great step forward in rail and trade co-operation, as it shows the possibilities of railhead depots in connection with which the service of the railway company can be used to ensure expeditious delivery of a firm's products. In this particular case traffic is moved from York after the completion of the day's work in the factory, and is ready for handling in London by the time work commences at the distributing depot. This means that traffic ordered the previous day can, so far as transport is concerned, be relied upon to be available early the following morning. The railway gains in that a shuttle service is in operation, the empties being returned to York in time for loading the next day, so that there is a double journey of the wagons (376 miles) in approximately 36 hours, while the trader gains by being relieved of the necessity to maintain heavy stocks to meet deficiencies in transport performance.

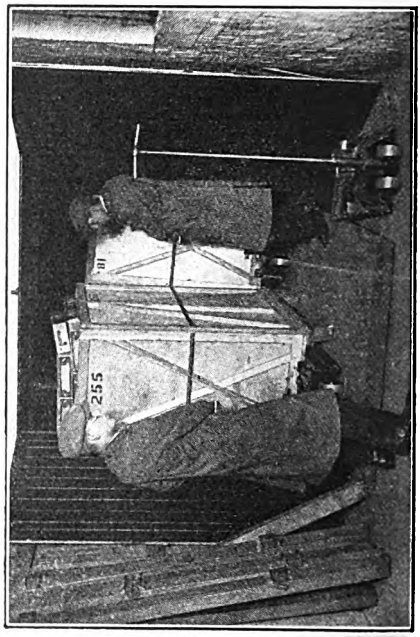
L.M.S.R. Distribution Warehouses.

The L.M.S.R., with the advent of grouping at the close of 1922, was enabled to release from their normal function a large number of warehouses at "key" points throughout the United Kingdom, and these were immediately placed at the disposal of the trading community. Many well-known firms dealing in all kinds of commodities have organised their distribution over the length and breadth of the country by the establishment of railhead

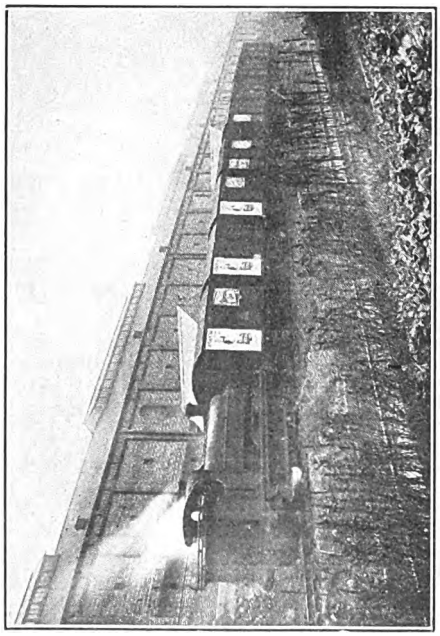
Digitized by Google



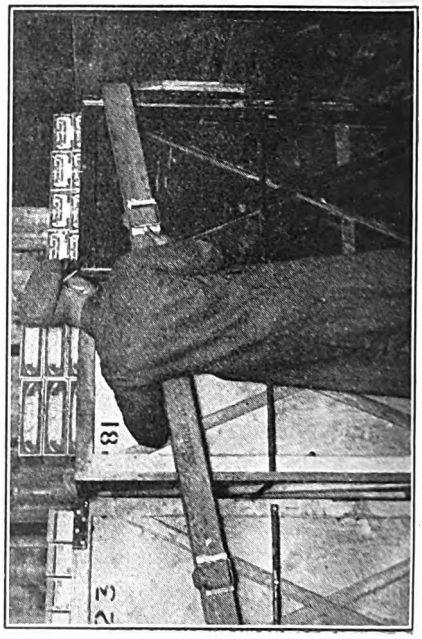
PLACING CONTAINERS IN ROAD VANS FOR DISTRIBUTION.



REMOVING CONTAINERS FROM RAILWAY WAGON WITH THE AID OF "JIGGERS."



PLACING WAGONS IN POSITION AT L.N.E.R. LONDON DEPOT.



RELEASING WEDGE BARS USED FOR RAILWAY WAGON CONTAINERS.

Digitized by Google

Digitized by Google

depots on the L.M.S. system at points conveniently situated in relation to the consuming areas.

Merchandise is conveyed by express freight trains in bulk from factory or importing centre. On arrival at railhead depot, wagons are unloaded direct to warehouse, after which bulk is broken and goods are sorted. Distribution to customers in the surrounding area is affected by means of a highly-organised system of road distribution.

The time factor is to-day predominant, and it is therefore worthy of note that railhead distribution enables orders to be met immediately from stock held locally, while each depot is fed by direct express freight trains, undoubtedly the quickest form of goods transport to-day available. Incidentally, there is also an actual saving of £ s. d. in respect of freight charges and packing costs, while experience proves that a marked increase in business follows upon the establishment of depots in the heart of the densely populated consuming areas.

Amongst the first firms to take up railhead distribution on scientific lines, mention may be made of S. P. D. Limited, the transport organisation for Lever Brothers and their associated companies, and Cadbury Brothers, the well-known chocolate manufacturers. Cadbury Brothers' London depot, opened nearly six years ago, at Camden Town, may be taken as typical. At this station, premises have been provided which, in addition to rail-side deck space and motor-loading berths, comprise stock-room, offices, and show room.

Ten covered railway vans, each conveying 6 tons of confectionery, are despatched from Bournville Works at 5.30 p.m. daily. These vans arrive at Camden at 2 a.m. the following morning, and are in position for unloading when the depot opens at 8 a.m.

A special feature of the arrangement is the packing of goods at the factory into "cages," which are transferred by means of hydraulic lift bogies into railway vans, each van holding 14 "cages." A special device secures the "cages" in position and prevents shifting of the load during transit. On arrival at the railhead depot, "lift bogies" are again used to transfer the "cages" to the stock-room, where the goods are unloaded, sorted, and taken into stock. Empty "cages" are returned to the waiting railway vans (which are kept in circuit between Bournville and London), and, travelling through the night, arrive at Bournville at 7.30 a.m. for reloading—a total of 38 hours for the round trip. Urgent orders for "speciality" lines not usually stocked at Camden can be obtained from Bournville and delivered to the customer in less than 24 hours.

In the stock-room, goods are assembled and packed for individual orders on to trays, and lift bogies are once more brought into operation for wheeling these trays to the fleet of waiting motor vans. Road distribution throughout Greater London is undertaken by Thomas Tilling Limited, from 15 to 20 motor loads, according to the season of the year, being despatched daily.

The success of railhead distribution may be gauged by the remarkable growth in the number of depots opened by the L.M.S.R. for individual firms during the last five years. In 1922, 63 depots were in operation, while to-day the figure exceeds 400, embracing many manufacturers whose names are household words. Commodities as widely divergent as cement, soap, cattle food, preserves, chocolate, groceries, mineral waters, toys and even motor-cars, are being transported and delivered under this scheme, the advantage of elasticity enabling it to be adapted to any individual requirements.

Reference may be made also to the fact that the L.M.S.R. is developing the container system of goods transport to allow of combined road and rail transit. This method permits the following conditions to be realised :—

(1) Door-to-door delivery without unloading and unloading at stations.
(2) Elimination of packing costs.
(3) Reduction in risk of damage or loss by theft.
(4) Saving in time and money.
(5) Speeding-up of goods services.

This system is being co-ordinated with the railhead distribution system described above. In conclusion, it may be said that railhead distribution effectively combines the advantages of two modes of transport, each supreme in its own sphere. Cheap and speedy rail conveyance is secured for traffic in bulk over the long

Digitized by Google

haul, while " door-to-door " distribution is efficiently performed by motor vehicles in the actual consuming areas. Undoubtedly, a big future lies ahead for the co-ordination of rail and road facilities along these lines.

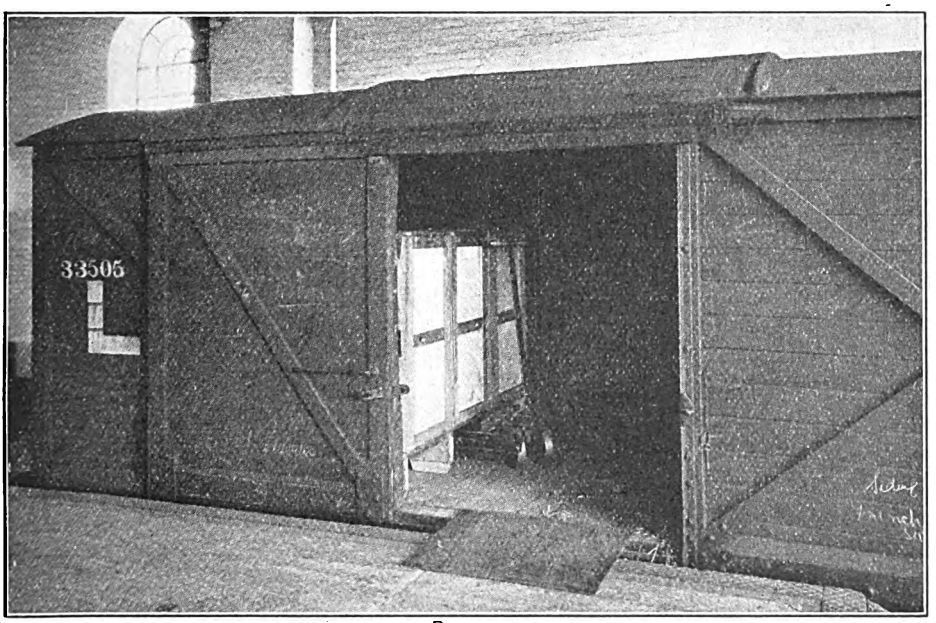
Rail-Road Traffic and the L.M.S.R.

In connection with the foregoing, reference may also be made to container traffic as it has been developed on the L.M.S.R.

The use of containers in the handling and transportation of merchandise constitutes a question which, in one form or another, has occupied the attention of railway executive officers from time to time in connection with the intensive development of freight operation, but more particularly from the point of view of the possible economies or other domestic advantages to be derived from the consequent saving in time and labour. They have, of course, been used for many years under particular circumstances, as, for example, in the case of luggage and parcels between London and Ireland or the Continent and involving cross-channel services, while in the case of goods traffic an outstanding instance is afforded by the late L. and Y. (now L.M.S.) Railway in the use of " flats "—a form of container—in connection with their extensive traffic in cotton goods. From the point of view of the trader, however, the inherent advantages of a system of transport affording " door-to-door " conveyance of merchandise, thereby avoiding the customary handling at railway depots, are apparent, and the march of progress, coupled with the development of competitive forms of transport, has during recent years brought this aspect of the question into increasing prominence.

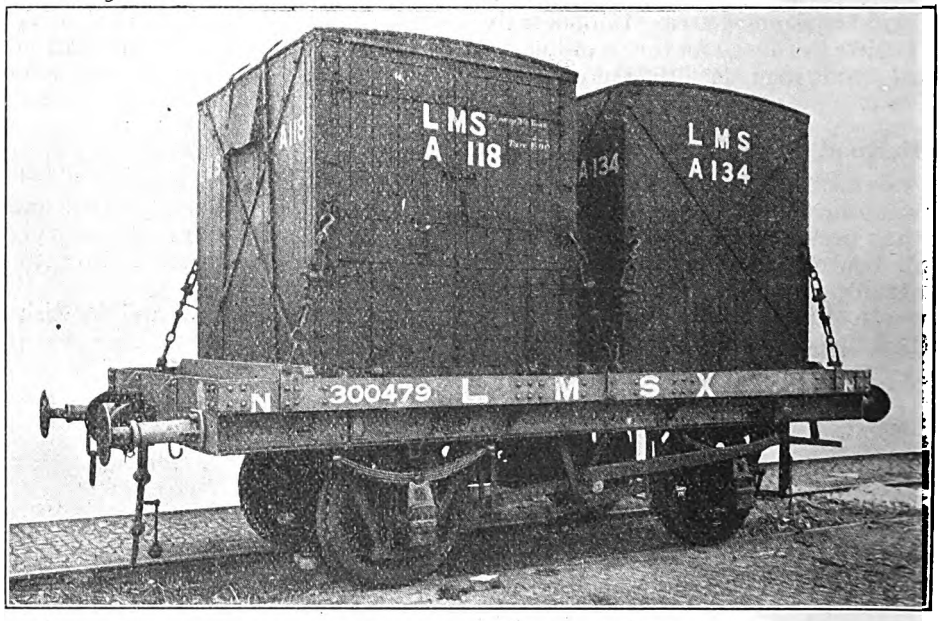
The London Midland and Scottish Railway has, over the past two years, been engaged in an exhaustive programme of research on the subject, accompanied by experiments which latterly have been carried out on a scale sufficiently extensive to afford a practical test of the possibilities of the system and to demonstrate its various features as affecting both the railway and the trader. In the course of these experiments, a sum of £20,000 has been expended, representing a total stock of between 400 and 500 containers, which have in the main been built in the L.M.S.R. Carriage and Wagon Works at Derby.

As a result of the experience gained, four types of container have been evolved as



" CAGE " READY FOR REMOVAL FROM L.M.S. RAILWAY VAN TO STOCK ROOM.

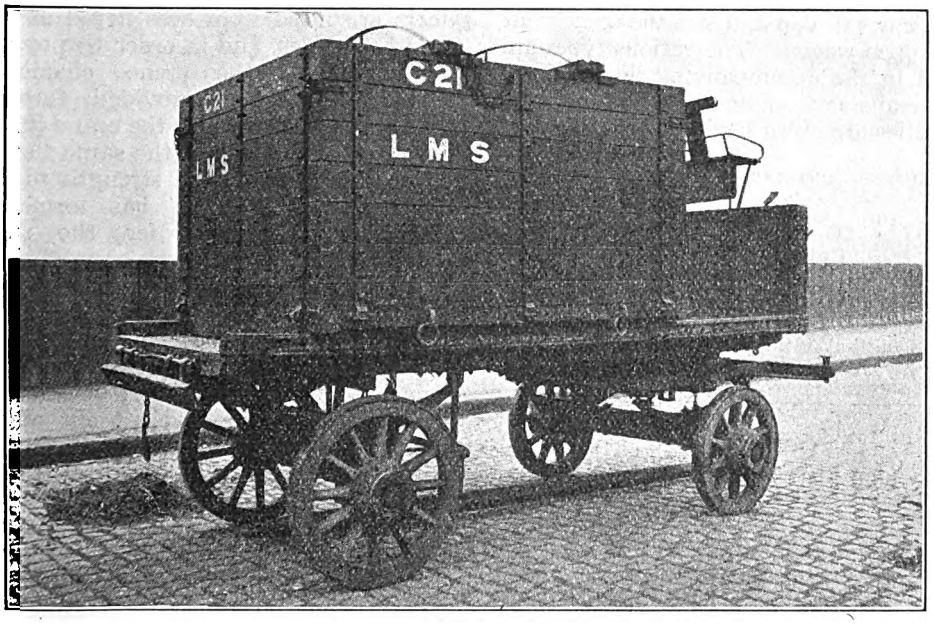
Digitized by Google



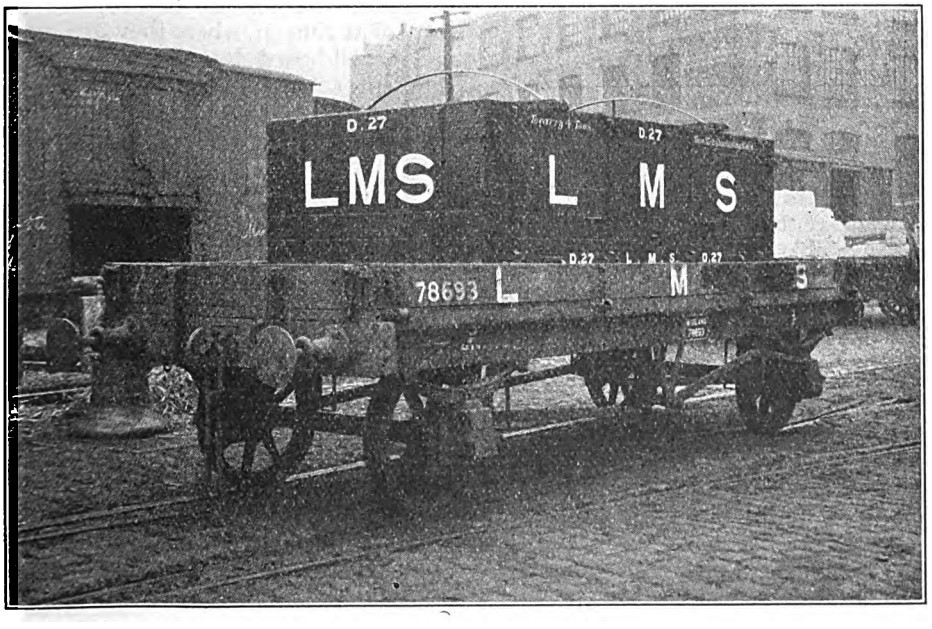
"A" TYPE SMALL CLOSED CONTAINERS.

"B" TYPE LARGE CLOSED CONTAINER.

Digitized by Google



"C" TYPE SMALL OPEN CONTAINER ON LORRY.



"D" TYPE LARGE OPEN CONTAINER IN POSITION ON WAGON.

Digitized by Google

standard, two representing the equivalent of the covered van and two the equivalent of the open wagon. The various types are shown in the accompanying illustrations, and details as to dimensions and carrying capacities are given below :—

CLOSED CONTAINERS, TYPES A AND B.

Type.	Dimensions (Interior).			Capacity in		Tare.
	Length.	Width.	Height (at Centre).	Tons.	Cub. ft.	
	Ft. Ins.	Ft. Ins.	Ft. Ins.			Cwt.
A ..	7 0	6 0	6 6	2½	273	16
B ..	13 6	6 0	6 6	4	526	25

OPEN CONTAINERS, TYPES C AND D.

Type.	Dimensions (Interior).			Capacity in Tons.	Tare.
	Length.	Width.	Height (of Sides).		
	Ft. Ins.	Ft. Ins.	Ft. Ins.		Cwt.
C ..	7 0	6 0	3 9	2½	9
D ..	13 4	6 0	3 9	4	17

In arriving at the various types, due regard has been necessary to the normal capacity of cranage and cartage equipment, while at the same time affording the largest possible capacity coupled with the lowest possible tare. Up to the present the containers have been of timber construction, although attention is being given to the possible use of steel or other metal.

The closed type containers are fitted with end doors, comprising a drop door at the bottom and a pair of swing doors above. A certain number are fitted with louvred ventilators in order to provide for traffics of a perishable nature. In the case of the open type containers both sides and ends are detachable, but the inevitable detraction from the strength of the walls has certain disadvantages, and consideration is being given to a new type "D" container having side drop doors, as in the case of the usual open wagon, and a single drop door at one end. These containers are lifted from eyes fitted at the base of the sides, and in order to prevent "binding" of the crane chains a "spreader" has been provided, through the grooved ends of which the crane chains are passed, and which at the same time is adapted to reinforce the strength of the sides. This "spreader" has formed a convenient foundation for the sheet bow.

Research is being made with the object of evolving a type of container of the roll-off type, *i.e.*, on wheels or castors, to obviate the necessity for a crane for transferring between rail and road vehicle.

With the gradual development of the number of stock in use, some method of control was found to be essential if light running was to be kept down and the stock worked as economically as possible. A system was, therefore, established, the whole of the stock being placed under the control of the Chief Goods Manager at Euston, although a certain amount of local autonomy was accorded the respective District Goods Managers so far as requirements within the limits of their particular districts were concerned. All movements of container stock are telegraphed to the control at Euston, where they are recorded on a wall-board by means of tickets—different coloured tickets being used for the respective types of container. The wall-board shows at a glance the following information in respect of each district :—

(1) Traffic waiting, *i.e.*, stock required.
(2) Supplied for loading.
(3) Arrival for delivery.
(4) On hand empty.

In this way it is possible to meet all shortages to the best advantage, and to manipulate the stock with the maximum of loaded user. In spite of the comparatively limited scale on which operations have been conducted, the proportion of loaded mileage has reached the vicinity of 80 per cent., which speaks highly for the efficacy of the system.

In dealing with this phase, it must be remembered that the development of the container by the L.M.S.R. Company has been in the main in the direction of its application as a "full-load" instrument, and movements of stock are, therefore, general and not confined to reciprocating streams of traffic between pairs of points.

Digitized by Google

Generally speaking, the use of containers is limited to consignments of one ton or over, from one sender to one consignee, although in suitable circumstances delivery to three or four addresses has been undertaken by special arrangement.

It will be apparent that with a facility of this kind, the operations of the railway company are altogether of a different character from those entailed in dealing with merchandise loaded in ordinary wagons.

The nature of the traffic to be conveyed in containers very largely determines the rates at which the merchandise is carried and conditions as to risk, &c.

The experience of the L.M.S.R. Company in regard to claims for damage, &c., has been noteworthy, as the following examples will show :—

400 loads of gas stoves carried for one firm with only six known cases of damage.

100 loads of enamel baths carried with three or four isolated damages.

Several hundred loads of new furniture, gramophones, &c., carried with almost complete immunity from damage.

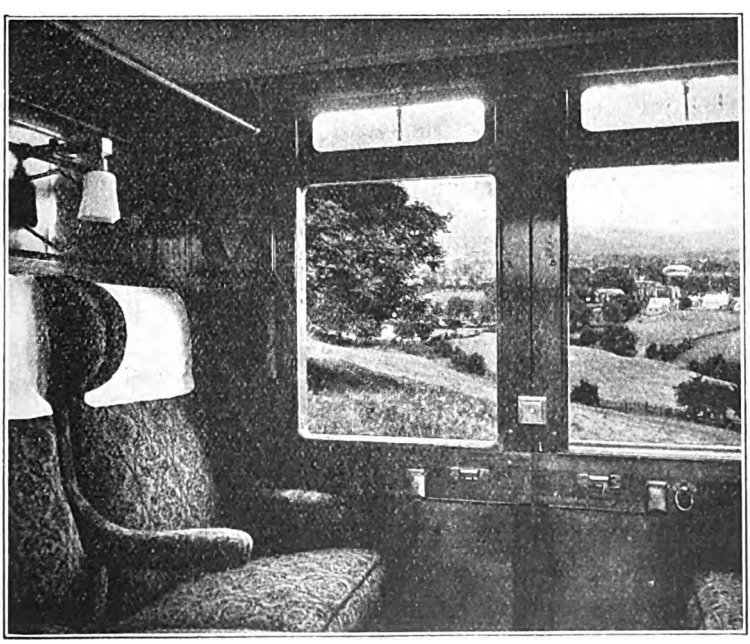
700 loads of preserves carried for one firm during five months. Claims (which arose mainly in connection with the return empty jars) paid to the extend of 0·22 per cent. of revenue.

In all these cases carriage by rail had dwindled to vanishing point, owing mainly to the growth of road transport.

The L.M.S.R. Company has found that the container system of railway transport provides the advantages arising from "door-to-door" service, *i.e.* :—

(1) Risk of damage or loss minimised.
(2) Packing costs reduced.
(3) Time and labour saved.

It is of interest to note that the use of containers by the L.M.S.R. has been the means of enabling a number of British traders to compete more successfully against foreign manufacturers for such traffics as enamelware, baths, &c.



INTERIOR OF FIRST-CLASS COMPARTMENT IN NEW CORRIDOR COACH, L.M.S.R.

Digitized by Google

New 2-6-4 Tank Locomotives, London Midland & Scottish Railway.

(*See Frontispiece.*)

ONE of a new class of superheated 2-6-4 passenger tank engines recently introduced on the London Midland & Scottish Railway is illustrated as frontispiece. Twenty-five of these locomotives are being built at Derby, to the design of Sir Henry Fowler, Chief Mechanical Engineer, and the first one to be completed was handed over to the Motive Power Department, Derby, in December last. The engines are numbered 2300 to 2324. They have been designed to give a tractive effort, at 85 per cent of the boiler pressure, of 23,125 lb., and, as indicated elsewhere, they have been introduced to work heavy local express passenger trains. With this end in view, capacities for 2,000 gallons of water and 3½ tons of coal have been provided.

The engines are equipped with outside cylinders, with their steam chests above them, the piston valves being actuated by Walschaert's gearing. A standard boiler has been utilised, this having a grate area of 25 sq. ft. The working pressure is 200 lb. per sq. in., and an exhaust steam injector of the latest Davies & Metcalfe type has been fitted on the right-hand side of the engine, *i.e.*, that on which the fireman stands. Ross patent "pop" type safety valves are mounted upon the firebox, which latter is of the Belpaire type. Mechanical lubrication is provided for the cylinders and piston rods, also for the piston valves and spindles, whilst the second mechanical lubricator supplies oil to the coupled axleboxes. The boiler is fitted with M.L.S. superheating apparatus.

The standard type of water scoops are fitted between the trailing coupled wheel and the leading wheel of the four-wheel bogie, this gear being so arranged that water can be picked up when the engine is running in either direction. In addition, standard locomotive fittings have been provided where possible in order to facilitate interchangeability. The cab is comfortable, roomy and well ventilated, easy control of all fittings being secured.

A "Dreadnought" combined large and small ejector is fitted, and the engine is piped to the front and rear ends with the vacuum train pipe, the application of the brake being controlled by the operation of the driver's brake valve in the usual manner. The engine is provided with steam brake acting on the coupled wheels, and also on those of the leading truck and trailing bogie.

The leading particulars are as follows:—

Cylinders (2), diam	19 in.
,, piston stroke ..	26 in.
Wheels, coupled, diam. ..	5 ft. 9 in.
Boiler, heating surface—	
Tubes	1,083·00 sq. ft.
Firebox	137·25 sq. ft.
Total	1,220·25 sq. ft.
Superheater	266·25 sq. ft.
Combined total	1,486·50 sq. ft.
Grate area	25 sq. ft.
Boiler pressure	200 lb. per sq. in.
Total weight in working order	86 tons 5 cwt.
Water capacity	2,000 gallons.
Coal capacity	3½ tons.

The disposition of the cylinders and the spacing of the coupled wheels is similar to that of the L.M.S. 2-6-0 type mixed traffic locomotives. These new tank engines will, doubtless, be found exceedingly useful for the purpose of handling local passenger trains running on fast schedules, such, for instance, as the London-Luton-Bedford service, which, of late years, has tended to increase considerably in volume and weight of trains.

Digitized by Google

British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

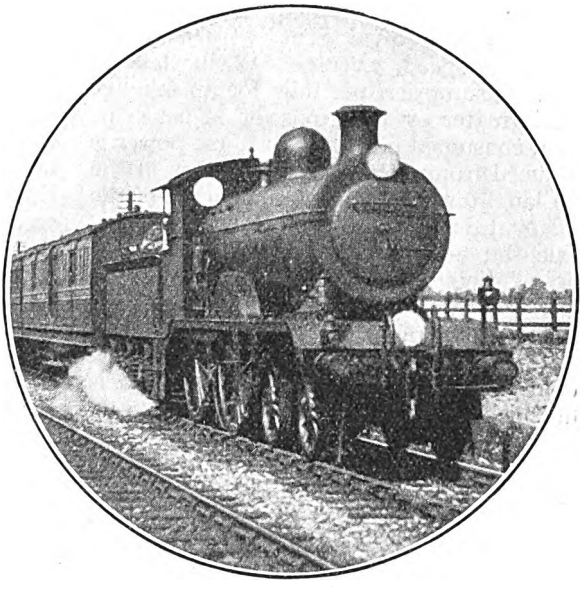


Photo.] [*E. A. Gurney-Smith.*

PORTSMOUTH-BRIGHTON TRAIN, S.R.
4-4-0 locomotive No. B320.

IT is eminently fitting that our consideration of the work of the new Great Western 4-6-0 "King George V" type engines, in the December issue, and of the rebuilt super-"Pacific" *Enterprise* of the L.N.E.R., in February, should be followed by some notes on the work of the L.M.S. "Royal Scot" locomotives. Unfortunately, I am not in a position to supplement my footplate observations on the running of the two types last-mentioned with a description of the footplate working of the "Royal Scot" class, but it is tolerably evident, from the published dimensions and the figures submitted by Sir Henry Fowler to the Institution of Mechanical Engineers, in the discussion following Mr. Lawford H. Fry's Paper on December 16 last, that the L.M.S. is at last in possession of a type of engine capable of handling heavy loads, and, further, of doing so with economy. There is little doubt that this economy is, as in the case of the Great Western and London and North Eastern engines already mentioned, the fruit of a high working pressure, a long valve-travel and ability to work the engines continuously in short cut-offs.

Sir Henry Fowler's figures, to which I have just referred, are of such uncommon interest that I have summarised the chief of them relating to coal consumption in the table on the following page. Test runs were made between Euston and Crewe, Crewe and Carlisle, and, in the case of the "Royal Scot" engines alone, from Euston through to Carlisle. Over the former sections a standard "Claughton" was tried between Euston and Crewe, and between Crewe and Carlisle a "Claughton," a "Claughton" modified by the substitution of the Caprotti valve-motion, and a Midland 3-cylinder compound 4-4-0. The "Royal Scot" trips consisted of three return journeys over each section, whereas in the case of the other locomotives one return journey in each case was made. On every trip the dynamometer car was in use, rendering possible the estimation of drawbar horse-power, but the engines were not indicated, so that indicated horse-power figures are not available. One's only regret in this connection is that the corresponding drawbar horse-power figures of the Great Western 4-6-0 engine *Launceston Castle*, which were recorded by the dynamometer car between Crewe and Carlisle during the exchange of 1926, are not available for purposes of comparison.

It is the "Claughton" whose reputation suffers in this table. Between Euston and

Digitized by Google

Crewe the "Royal Scot" trips, at an identical speed, average 1·2 lb. less in coal consumption per mile for an average load greater by 128½ tons, or 34 per cent. Coal consumed per drawbar horse-power is reduced from over 5 lb. in the case of the "Claughton" to under 3 lb. in that of the "Royal Scot." Between Crewe and Carlisle the tale is the same. The "Royal Scot," tieing in speed with the "Claughton," takes 431½ tons over Shap against 315½—an increase of 37 per cent.—on a coal consumption less by 2½ lb. per mile. Coal consumed per drawbar horse-power is in this case reduced from 4·86 to 2·95 lb. (No. 6100 was, throughout, the engine of this class under test) is, indeed, very striking.

As regards individual performances, the heaviest trains run by the "Royal Scot" were made up to 551 tare tons between Euston and Crewe, which included a certain proportion of empty vehicles, so that the gross weight behind the tender probably did not exceed 575 or 580 tons at most. On the up journey this load was worked from Crewe to Euston at an average speed of 51 m.p.h. A train whose tare weight was 497½ tons was worked to Euston at the higher average rate of 55·2 m.p.h. The best run from Crewe to Carlisle, with 451½ tare tons behind the tender, was completed at an average of 51·4 an hour, while practically the same load—to be exact, 449½ tons—was worked through from Euston to Carlisle at a throughout average of 53·0 m.p.h. Only 100 passengers were actually carried on this trip, so that the gross load, passengers and luggage included, was probably little, if at all, in excess of 460 tons. The astonishing load figures which were freely circulated to the Press concerning these runs gave the train-loads *inclusive of engine and tender*, involving a modest addition of 121 tons!

COMPARISON OF WORK PERFORMED BY DIFFERENT TYPES OF LOCOMOTIVE OVER THE WEST COAST MAIN LINE, L.M.S.

(Averaged from figures submitted by Sir Henry Fowler, Chief Mechanical Engineer, L.M.S., in discussion, following Mr. Lawford H. Fry's Paper to Institution of Mechanical Engineers December 16, 1927.)

Route.	Type of Engine.	No. of Runs.	Average tare load.	Coal Consumed.			Average Speed.
				Per mile.	Per Drawbar h.p.	Per 1,000 ton-miles.	
			tons	lb.	lb.	lb.	m.p.h.
Euston-Crewe ..	"Claughton" ..	2	380	46·6	5·02	99	54·0
,, ..	"Royal Scot" ..	5	508½	45·4	2·93	75	53·9
Crewe-Carlisle ..	"Claughton" ..	2	315½	44·5	4·86	104	49·8
,, ..	Caprotti-gear "Claughton" ..	2	326½	40·0	4·04	92	50·0
,, ..	Standard Midland Compound ..	2	297½	34·1	3·78	87	50·0
,, ..	"Royal Scot" ..	6	431½	41·9	2·95	76	49·8
Euston-Carlisle ..	"Royal Scot" ..	6	430	40·5	3·00	80	51·3

The improvement of the "Claughton" type by means of the Caprotti valve-motion is seen to make some difference, reducing the coal consumption by 4½ lb. per mile, and per drawbar horse-power from 4·86 to 4·04, but far from sufficiently to make up the enormous disparity. The much smaller Midland 4-4-0 compound has nothing to be ashamed of, taking only 18 tons less than the "Claughton" at the same speed with a difference in coal consumption of no less than 10·4 lb. per mile. There is enough uniformity in the figures to guarantee that the conclusions are well-founded; the consistency of the figures in the performances of the "Royal Scot"

Digitized by Google

By the kindness of a valued correspondent, I have been put in possession of the times that were achieved on this journey between Euston and Carlisle, and these are given herewith. I have tabulated the run exactly as received, my friend taking most of his observations at definite mile posts, as shown. A special schedule was in force on this run, with 7 min. less than the normal allowance to Carlisle, where the train was due at 3.38 p.m. Incidentally, with 5 min. at Carlisle, and the 2 hrs. 7 min. thence to Glasgow of the old 2 p.m. from Euston, the train would have been due in Glasgow Central at 5.50 p.m., instead of 6.15 p.m.

L.M.S. "Royal Scot" Express Euston–Carlisle.

Engine: 3-Cyl. 4-6-0 No. 6100, *Royal Scot.*
Load: 64 axles, 449½ tons empty, 465 tons full.

Miles.		hr.	min.	sec.
0·0	Euston	10	00	32
1·0	Mile-post 1		03	56
			p.w.s.	
2·5	,, 2½		06	59
4·0	,, 4		10	03
5·5	Willesden Jc. (m.p. 5½) ..		12	56
			p.w.s.	
8·0	Wembley (m.p.8) ..		17	28
17·5	Watford (m.p. 17½) ..		29	15
21·0	King's Langley (m.p. 21)		32	54
24·5	Boxmoor (m.p. 24½) ..		36	31
28·0	Berkhamsted (m.p. 28) ..		40	16
31·0	Mile-post 31		43	35
31·7	Tring		44	17
46·7	Bletchley		56	57
56·0	Mile-post 56	11	04	54
59·9	Roade		08	40
61·0	Mile-post 61		09	52
62·8	Blisworth (m.p. 62¾) ..		11	35
72·0	Mile-post 72		20	07
76·0	,, 76		24	12
79·0	,, 79		27	18
81·0	,, 81		29	31
82·5	Rugby (m.p. 82½)* ..		31	20
83·2	Rugby No. 7 (m.p. 83¼)		32	36
97·0	Nuneaton (m.p. 97) ..		48	48
110·0	Tamworth (m.p. 110) ..	12	00	50
116·2	Lichfield (m.p. 116¼) ..		07	08
124·2	Rugeley (m.p. 124¼) ..		15	29
129·5	Milford (m.p. 129½) ..		20	47
133·0	Mile-post 133		24	44
133·5	Stafford (m.p. 133½) ..		25	21
139·0	Norton Bridge (m.p. 139)		31	53
147·5	Whitmore (m.p. 147½) ..		41	40
153·2	Betley Road (m.p. 153¼)		47	43
157·0	Mile-post 157*		51	00
158·0	Crewe (m.p. 158)* ..		52	53
159·0	Mile-post 159		54	55
165·5	Winsford (m.p. 165½) ..	1	04	32
172·5	Acton Bridge (m.p. 172½)		11	44
174·2	Weaver Jc. (m.p. 174¼)*		13	27
179·2	Moore (m.p. 179¼) ..		18	26
180·5	Mile-post 180½		19	40
182·0	Warrington (m.p. 182) ..		21	09
188·0	Golborne Jc.		27	35
193·4	Mile-post 6		33	25
			p.w.s.	
193·9	Wigan		34	41
194·4	Mile-post 7		35	23
195·4	,, 8		37	19
196·1	Boar's Head Jc. (m.p. 8¾)		38	58
198·9	Mile-post 11½		43	44
203·6	Euxton Jc. (m.p. 16¼) ..		48	32
208·4	Mile-post 21*		53	05
209·1	Preston (m.p. 21¾)* ..		54	21
210·1	Mile-post 1		56	26
211·1	,, 2		58	02
213·8	Barton (m.p. 4¾) ..	2	01	47
219·6	Garstang (m.p. 9½) ..		06	38
224·3	Bay Horse (m.p. 15¼) ..		12	17
230·1	Lancaster (m.p. 21) ..		17	50
236·3	Carnforth (m.p. 6¼) ..		23	55
239·6	Mile-post 9½		27	15
243·6	Milnthorpe (m.p. 13½) ..		31	16
245·1	Mile-post 15		32	52
247·1	,, 17		35	12
249·1	Oxenholme (m.p. 19) ..		37	56
250·1	Mile-post 20		39	28
251·1	,, 21		41	13
252·1	,, 22		43	00
253·1	,, 23		44	48
254·1	,, 24		46	33
255·1	,, 25		48	23
256·1	,, 26		50	18
256·6	Grayrigg (m.p. 26½) ..		50	45
262·2	Tebay		57	05
263·1	Mile-post 33		57	58
264·1	,, 34		59	07
265·1	,, 35	3	00	38
265·6	,, 35½		01	34
266·1	,, 36		02	38
266·6	,, 36½		03	49
267·1	,, 37		05	07
267·6	,, 37½		06	26
267·8	Shap Summit (m.p. 37¾)		06	58
277·1	Clifton (m.p. 47)		16	34
281·3	Penrith (m.p. 51¼)* ..		20	38
286·1	Plumpton (m.p. 56) ..		25	17
294·3	Wreay (m.p. 64¼)* ..		32	40
299·1	Carlisle (m.p. 69)		38	41

* Service slack.

My correspondent adds, by way of comment on his timings: "We had four permanent-way slacks, two that were severe at Kilburn and Willesden, a long one from Minshull Vernon, and a very costly delay just south of Wigan station. I estimate the total loss at 10 min. 25 sec.—2 min., 2¼ min., 2 min. 40 sec., and 3½ min.—making a net time of 5 hrs. 27¾ min. There was no high downhill speed, save from Tring to Castlethorpe, where we ran between mile-posts 31 and 56 in 21 min. 19 sec., at an average of exactly 70 m.p.h., to get back to schedule after the initial delays and the poor running on to Watford.

Digitized by Google

From Rugby to Whitmore the running was very easy, and from Shap Summit to Carlisle the time of 31 min. 43 sec. is an evidence of restraint on the part of the driver. All the usual service slacks, and particularly Rugby, were taken very carefully also." Minimum speeds were 53½ m.p.h. at Tring Summit, 57 at Roade, 58 at Kilsby Tunnel, 47½ at Whitmore, 27 up Boar's Head bank (after the Wigan slack), 51 at Burton (from 66 at Carnforth), 31 at Grayrigg, and 22½ at Shap Summit. It is interesting to note that the time from Preston to Carlisle—104 min. 21 sec.—was very slightly in excess of the one-time 104-min. allowance of the 2 p.m. from Euston.

From this I pass to the everyday running of the "Royal Scots." I am bound to say that my average experience of them—and I have deliberately waited until I had a fair number of runs on which to base a conclusion—does not, as yet, come up to the standards that I have described. The first of these journeys was, for a good part of its length, a brilliant effort. The Aberdeen express due in Euston at 7.30 p.m., had been brought from Crewe to Rugby by "Claughton" No. 5961; with a 54-axle train of 420 tons' gross weight, we did not do too badly to take 17 min. 20 sec. to Whitmore, with a maintained speed of 41 m.p.h. on the 1 in 177; 13 min. 10 sec. from there to Stafford, touching 70½ m.p.h.; 11 min. 5 sec. on to Rugeley, 8 min. 10 sec. thence to Lichfield, and 5 min. 50 sec. between Lichfield and Tamworth, with a maximum of 66 m.p.h.; 14 min. 35 sec. from Tamworth to Nuneaton, and 17 min. thence to Rugby stop, with respective minima of 48½ and 50 m.p.h. on the two up grades. This made a total of 87 min. 10 sec. from Crewe to Rugby, against 86 min. booked, and our initial lateness of about 8 min. thus became just over 9 min.

The "Claughton" gave place, at Rugby, to No. 6106 of the "Royal Scot" type. By overtime at Rugby, we left there 12½ min. late, and to my surprise lost a further 3¼ min. to Blisworth, taking 27¼ min. for the 19·7 miles, instead of the admittedly sharp booking of 24 min. Speed did not rise above 40 m.p.h. on the ascent to Kilsby nor did it exceed 65 at Weedon. From Blisworth, however, the run was so striking that I have tabulated it in detail, with all the intermediate speeds. It was not until after Bletchley that the real effort was made, but 14 min. 40 sec. for the 15 miles from there up to Tring was a fine time with 420 tons, and 11¾ min. from there to Watford, with a maximum rate of 80½ an hour on the 1 in 330, was quite thrilling. So, after an initial loss of 80 sec. to Bletchley, the driver picked up nearly 5 min. to Willesden, despite a signal check below Harrow (when we were travelling again at 79 an hour), but lost a minute from there to Euston by further checks. Our gross time from Blisworth to Euston was 65½ min. for the 62·9 miles, but the net time did not exceed 63 min., in place of the 69 min. allowed.

L.M.S. 6.21 P.M. BLISWORTH-EUSTON.

Engine: 3-Cyl. 4-6-0 No. 6106.
Load: 54 axles, 390 tons empty, 420 tons full.

Distance		Sched.	Actual.	Speeds
miles.		min.	min. sec.	m.p.h.
0·0	Blisworth ..	0	0 00	—
3·0	Roade ..	5	6 35	—
8·1	Castlethorpe..	—	11 40	68
10·4	Wolverton ..	—	13 45	—
16·2	Bletchley ..	18	19 20	60
22·7	Leighton ..	—	25 30	66
26·8	Cheddington..	—	29 20	60
31·2	Tring ..	35	34 00	54
34·9	Berkhamsted	—	37 35	70½
38·4	Boxmoor ..	—	40 25	77½
41·9	King's Langley	—	43 05	80½
45·4	Watford ..	49	45 45	—
46·9	Bushey ..	—	46 55	68
49·6	Hatch End ..	—	49 10	74
51·5	Harrow ..	—	50 40	79
			sigs.	50
54·8	Wembley ..	—	53 25	—
57·5	Willesden Jc.	61	56 10	60
			sigs.	40
62·9	Euston ..	69	65 30	—

Subsequent experiences on the same train, by which it is my lot frequently to travel, have, however, been very different. Engines of the "Royal Scot" type work it through from Carlisle to Euston, being changed at Crewe; the normal load is six vehicles from Carlisle to Preston, eight from there to Crewe, and 10 from Crewe to Euston, which is a very modest tax on engines of such power. On several runs we have been punctual throughout, and with no signal or permanent-way checks the usual load of but 325 tons all found

Digitized by Google

has naturally given no occasion for any running worthy of note. But on one evening when a serious signal delay at Brinklow had made us 20 min. late from Rugby, with a heavier-than-usual load of 400 tons, and *two* "Royal Scots"—No. 6146 was attached at Rugby as pilot to No. 6111—some recovery of time might surely have been expected. Instead of which, the two engines between them actually lost 1 min. 35 sec. to Blisworth, attaining 48½ m.p.h. at Kilsby and not exceeding 60 down to Weedon, and then contrived to gain the modest total of 25 sec. from Blisworth to Euston. The whole way down the 1 in 330 from Tring to Watford we were travelling at *under* 60 m.p.h., and the only demonstration of any note was the somewhat extraordinary time of 13 min. 50 sec. from Bletchley up to Tring, with a maximum rate of 70½ m.p.h. between Bletchley and Leighton, and a minimum of 60½ at Tring Summit. That is to say, we ran considerably faster uphill than downhill!

Singularly enough, at the very moment of writing, I have been travelling on the same express, with similarly disappointing results. A "Royal Scot" brought the usual six coaches into Preston on time, and we left there to time, with the two Whitehaven coaches added. At Warrington this engine failed; a "Precursor" was promptly substituted, but made some terribly dreary running from there to Crewe, where we arrived 20 min. late. Two more coaches were then attached, making the total load up to 310 tare tons, or 325 tons full, and with a fresh "Royal Scot" I did think we might anticipate some brighter travelling on to town. Not so, however. No. 6113 fell to 43½ m.p.h. up to the 1 in 177 to Madeley, never exceeded 61½ down to Stafford, was badly checked by signals at Stafford and Milford, and so took 93 min. 40 sec. over the 75·6 miles from Crewe to Rugby, instead of the scheduled 86 min. Over the unchecked length from Rugeley to Rugby we succeeded in dropping 2 min. 25 sec. Time was again lost from Rugby to Blisworth, this length requiring 25 min. 35 sec., instead of 24 min., but we did manage to run from Blisworth to Euston in 68 min. 30 sec., or 30 sec. under booked time. Over this stretch, yet again, we lost 2 min. from Blisworth to Tring, where speed fell to 47½ m.p.h., the ½-min. gain being only achieved by fast running below Berkhamsted, with a maximum of 72½ m.p.h., and, in particular, by the unusually

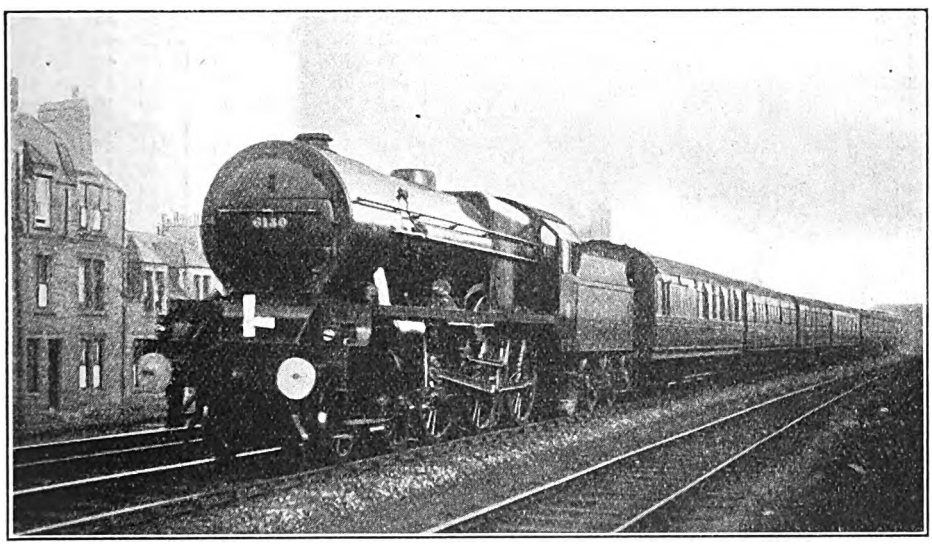


Photo.] [*P. Ransome-Wallis.*

EDINBURGH-GLASGOW EXPRESS NEAR MERCHISTON.

3-cylinder 4-6-0 No. 6130 "Royal Scot" class.

Digitized by Google

L.M.S. 10.30 A.M. EXPRESS, EUSTON–CREWE.

Distance.	Engine, 4-6-0, No. .. Load (axles) .. .. ,, (tons tare) .. .. ,, (tons full)	Schedule.	‖6126 68 480 510	‖6138 66 486 515	‖6142 68 494 520	†5000 62 451 470
miles.		min.	m. s.	m. s.	m. s.	m. s.
0·0	Euston	0	0 00	0 00	0 00	0 00
1·2	Camden No. 1	—	3 40	—	—	4 20
						sigs.§
5·4	Willesden	10	10 30	11 25	9 45	12 50
						p.w.s.§
8·1	Wembley	—	13 45	14 40	12 45	17 55
11·4	Harrow	—	18 15	18 50	16 45	22 35
13·3	Hatch End	—	21 00	21 15	19 05	25 05
16·0	Bushey	—	24 20	24 30	22 15	28 25
			p.w.s.§			
17·5	Watford	24	26 30	26 05	23 55	30 00
21·0	King's Langley	—	32 20	29 55	27 40	33 45
24·5	Boxmoor	—	36 50	33 55	31 40	37 35
28·0	Berkhamsted	—	41 05	38 10	35 45	41 35
31·7	Tring	41	45 35	42 55	40 10	46 05
					sigs.‡	
36·1	Cheddington	—	49 50	47 15	44 45	50 30
40·2	Leighton	—	53 25	50 50	48 15	54 00
46·7	Bletchley	55	59 05	57 00	53 45	59 45
52·5	Wolverton	—	64 10	62 35	58 30	64 55
54·8	Castlethorpe	—	66 20	64 55	60 30	67 05
59·9	Roade	68	71 45	70 35	65 45	72 30
62·9	Blisworth	71	75 00	73 55	69 00	75 40
69·8	Weedon	—	81 15	80 40	75 15	82 00
75·3	Welton	—	86 45	86 35	80 45	87 45
80·3	Hillmorton Box	—	91 50	91 50	86 00	93 00
			sigs.			
82·6	Rugby*	92	95 50	94 15	88 55	95 20
83·2	Rugby No. 7	—	97 15	95 40	90 05	96 30
88·1	Brinklow	—	103 20	102 05	96 10	102 15
91·4	Shilton	—	106 45	105 50	99 45	105 40
93·5	Bulkington	—	109 00	108 20	102 00	107 55
97·1	Nuneaton	108	112 20	112 00	105 25	111 15
102·3	Atherstone	—	116 55	116 55	110 00	115 55
106·5	Polesworth	—	120 30	120 45	113 40	119 35
110·1	Tamworth	122	123 45	123 50	116 40	122 40
116·3	Lichfield	128	129 45	130 10	122 30	128 20
					eased.	
121·1	Armitage	—	134 35	135 20	128 10	133 10
124·3	Rugeley	136	137 35	138 35	131 40	136 10
127·2	Colwich	—	140 10	141 35	134 50	138 55
				sigs.§		
129·6	Milford	—	142 15	145 05	137 45	141 10
133·6	Stafford*	146	146 45	152 00	143 25	145 40
136·9	Great Bridgeford	—	151 00	156 25	147 40	149 40
138·9	Norton Bridge	153	153 20	158 30	150 05	151 55
143·5	Standon Bridge	—	158 40	163 25	155 30	157 00
					sigs.§	
147·6	Whitmore	164	163 20	167 45	161 15	161 30
150·2	Madeley	—	166 10	170 20	165 30	164 15
153·4	Betley Road	—	169 05	173 05	168 45	167 20
156·0	Basford Sidings Box ..	—	171 35	175 30	171 15	169 55
158·1	Crewe	175	175 30	178 55	175 10	173 25
158·1	Net times (min.)	175	171	175½	172¶	168

* Service slack. † G.W.R. 4-cylinder 4-6-0, No. 5000, *Launceston Castle*. ‡ Very slight slack. § Severe checks. ¶ 168 min. with continuation of normal running, Lichfield–Stafford. ‖ 3-cylinder 4-6-0 "Royal Scot" class.

Digitized by Google

fast time of 7 min. from Willesden into Euston. Leaving Crewe 19 min. late, and economising a minute in the Blisworth stopping time, we reached Euston 25½ min. late—a dismal experience. The only palliation was the stormy character of the night on which the run was made, though with so modest a load as 325 tons this was far from sufficient to account for the time definitely lost by so powerful a locomotive.

From this I pass to the main table of the article, wherein are detailed three "Royal Scot" runs with loads comparable with those of the tests already summarised. 15-coach formations. The start, banked as usual up to Camden, was poor thereafter, as speed did not rise above 44 m.p.h. at Willesden, nor above 53 beyond Bushey; apart from the slack through Watford, the engine would have been at least 2 min. down on schedule there. From Watford better work was done, speed rising to 51 an hour up the 1 in 330, but the arrears of time at Tring amounted to 4½ min. Maximum rate between there and Bletchley was 71½ m.p.h., and minimum up to Roade 50, followed by a top speed of 69 an hour at Weedon and a lowest rate of 56½ up to Kilsby. Signals

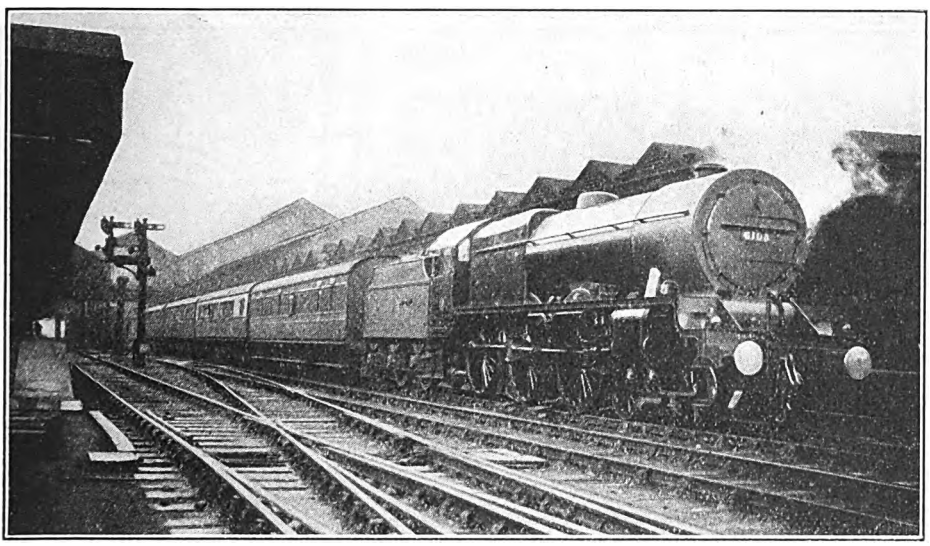


Photo.] [*Rev. J. S. Caddick-Adams.*

ANGLO-SCOTTISH EXPRESS AT CREWE.

3-cylinder 4-6-0 No. 6103 "Royal Scot" class.

All the runs were made with the 10.30 a.m. down Liverpool and Manchester express, non-stop between Euston and Crewe, incorporating in each case additional portions for boat passengers leaving Liverpool the same day. With these three runs I compare, as a matter of interest, one of the heavier-loaded journeys made by the Great Western 4-6-0 engine *Launceston Castle* during the exchange trials of 1926. Of the three "Royal Scot" trips, the first and third were timed by correspondents, and that behind No. 6138 by myself.

No. 6126 had a 16-coach train, but the inclusion of lighter stock made the total tare less than that of the two subsequent were on approaching Rugby, involving a loss of 1¼ min. additional to the 3 min. loss sustained at Watford, so that the net time to Rugby—91½ min.—was ½-min. under booked. There was a slight loss of time on to Nuneaton, but from there to Tamworth—where the booking of 14 min. for 13 miles downhill clearly makes allowance for possible slowings over the pitfalls near Polesworth—a speed of between 70½ and 72 m.p.h. resulted in a gain of 2½ min., reducing the time arrears to 1¾ min. This small margin was gradually recovered until the train was slightly in front of time at Whitmore. Speeds were 55½ m.p.h. on the rise after

Digitized by Google

Lichfield, 66½ before Rugeley, 44 round Trent Valley curve, 53½ at Norton Bridge, 52½ before Whitmore, and 66½ down Madeley bank. I make the net time for the journey 171 min., which exactly equals the pre-war allowance of this express; gross time was a shade over booked.

On my run I was not so fortunate. We dropped 2 min. out to Watford, remained 2 min. behind from there to Bletchley, lost 2 min. more on to Nuneaton and then, as on the last run, picked up a little over 2 min. between Nuneaton and Tamworth, and were 2½ min. behind time at Rugeley, before encountering a bad signal check at Milford, which put us 6 min. in arrears through Stafford, with no hope of a punctual arrival at Crewe. The best running of the journey was probably between Stafford and Crewe, where we recovered 2 min., but even so we arrived 4 min. behind time, and on my calculation we should not have kept our 175-min. schedule even apart from the Milford delay. The speeds that I noted were 49½ m.p.h. at Willesden, 47 at Hatch End, 55½ at Watford, 55 at King's Langley, 51 at Boxmoor, 47 before Tring, 68 at Cheddington, 62½ at Wolverton, 48 at Roade, 61½ at Weedon, 52 at Kilsby, 60 before and 30 through Rugby, 52 at Brinklow, 66 at Nuneaton, 62½ at Atherstone, 67 at Polesworth, 52½ after Lichfield, 10 (by signal check) at Milford, 55 at Great Bridgeford and 75 down Madeley bank.

One cannot help thinking that the trouble lies in the method of driving rather than in the design, to whose excellence the tests already mentioned have borne ample witness. As previously with the Midland compounds, when they were first introduced on the Western "A" Division, difficulty is probably being experienced in inducing the drivers to work with their regulators well open and cut-off brought well back, for the runs already described bear the marks of the opposite method of manipulation. It is for this reason that I consider the third of these down runs really to represent the capacity of the "Royal Scot" class. No. 6142 made much the best start of the three trips, and was doing 53 m.p.h. at Willesden; after that the speeds were 48 m.p.h. at Hatch End, 56 at Watford, a minimum of 51 before Tring, a sustained 70-71 after the slight Cheddington check, rising to 73 at Wolverton, 56 at Roade, 66 at Weedon, 57 at Kilsby and 64 before the Rugby slack. To this point the engine had gained 3 min., but there was little sub-

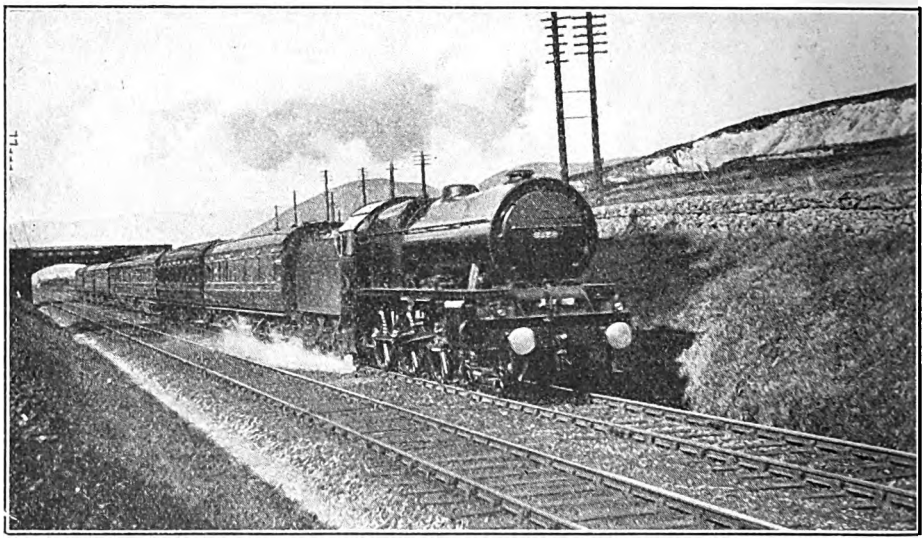


Photo.] [*C. J. L. Romanes.*

EDINBURGH-LONDON EXPRESS CLIMBING TO BEATTOCK SUMMIT.

3-cylinder 4-6-0 No. 6128, "Royal Scot" class.

Digitized by Google

sequent relaxation of effort. By Nuneaton the speed was again 73 m.p.h., followed by 65 at Atherstone, 70 beyond Polesworth, and 61 at Lichfield. Now, as the train was 5½ min. ahead of time, the engine was very definitely eased, fully 4 min. being dropped on normal running as between Lichfield and Stafford. A very bad check through Whitmore also brought the speed down to 10 m.p.h., and was a further source of lost time; it was followed by a top speed of 72 m.p.h. down Madeley bank. Despite these handicaps, however, arrival was effected in Crewe almost exactly on time; allowing for the two checks, I make the net time 172 min., and a continuation of the uninterrupted effort made south of Lichfield would have made a net time of 168 min. to Crewe easily possible.

We came, last, to the running of the Great Western engine *Launceston Castle*, which makes a most striking comparison with the last run. The train hauled by the "foreigner" was lighter by 50 tons, it is true, but the engine was of 80 tons' weight, as against the 85 tons of the "Royal Scot"; further the G.W. locomotive experienced no difficulty in keeping time with 489 tare tons on the up journey, achieving, in fact, a net time of 166½ min., as the March issue of last year bore witness. The close correspondence between the actual running times of the two totally dissimilar locomotive types on these third and fourth down runs is really most striking. The Great Western engine was badly delayed at Kilburn and beyond Willesden, and so was 6 min. 10 sec. behind the "Royal Scot" at Bushey; at Cheddington *Launceston Castle* had pulled up to 5 min. 45 sec. behind, but at Welton had fallen to exactly 7 min. behind; then came a recovery to 5 min. 50 sec. behind at Nuneaton, which was maintained to Lichfield. After that the comparison is vitiated by the intentionally easy running of the "Royal Scot." But from Bushey to Lichfield there is no greater variation of the running times at any point than a maximum of 75 sec. Driver Young, on *Launceston Castle*, steadily recovered his arrears of time, which amounted to 6 min. late through Watford, until at Tamworth the train was only 40 sec. behind, and at Stafford 20 sec. early; by Whitmore Young was 2½ min. early, having gained 8½ min. from Watford. In calculating net times, in the March (1927) issue, I am inclined to think—in the light of subsequent experience with these very heavy trains—that I allowed

Photo.] [*M. W. Earley.*

DOWN MAIN LINE TRAIN, L.M.S.R.
Three-cylinder 4-6-0 No. 6105, "Royal Scot" class.

Digitized by Google

for the possibility of a more rapid start than Young would actually have made, given a clear road. I estimated for a punctual passage through Watford, but 25 min. from Euston is a more probable time, which would give a net time of 168 min. from Euston to Crewe, exactly tieing with that of the "Royal Scot."

The speeds of *Launceston Castle*, which may with advantage be recapitulated, were 46 m.p.h. (accelerated from 21 at Willesden) at Hatch End, 57 at Watford, 48½ before Tring, 71½ at Cheddington, 68 at Bletchley, 70½ at Wolverton, 52 at Roade, 66 at Weedon, 53½ at Kilsby, 62½ at Hillmorton, 30 through Rugby, 57½ at Brinklow (after a fine acceleration from Rugby), 70½ at Nuneaton, 65 at Atherstone, 71½ at Polesworth, 56½ beyond Lichfield, 66 at Rugeley, 40 through Stafford, 55 at Standon Bridge, 52½ at Whitmore, and 65 down Madeley bank.

My remaining two "Royal Scot" runs have been respectable, but without any particular claims to brilliance. On the 1.30 p.m. down "Midday Scot," No. 6110 had a 54-axle train of 400 gross tons, and passed Willesden in 9 min. 55 sec., Watford in 22 min. 50 sec., Tring in 38 min. 5 sec.—an excellent start—Bletchley in 53 min. 5 sec., Roade in 66½ min., and Weedon in 76½ min., reaching Rugby in 90¾ min. Speeds were 60 m.p.h. beyond Willesden, 53½ at Hatch End, 62½ at Watford, and 51 before Tring, after which there was "nothing to report," save a maximum of 67 an hour at Weedon. From Rugby we passed Nuneaton in 17 min. 50 sec. at 68 m.p.h., Tamworth in 30 min. 50 sec., Rugeley in 46 min. 20 sec., Stafford in 56 min. 20 sec., and Whitmore in 72½ min., at 50½ m.p.h.; adverse signals brought us to a stand outside Crewe, after a maximum of 70½ down Madeley bank, in 83 min. 40 sec. from Rugby. Schedule time is 93 min. from Euston to Rugby and 85 min. thence to Crewe.

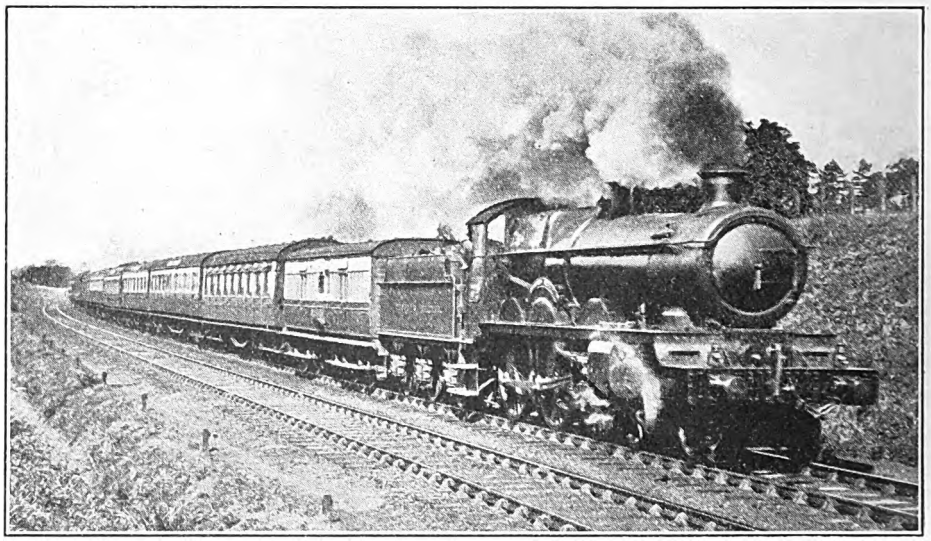


Photo.] [*W. Leslie Good.*

UP BIRMINGHAM EXPRESS, G.W.R.

Four-cylinder 4-6-0 No. 4072, *Tresco Abbey.*

Coming up on the 5.4 p.m. from Crewe, No. 6125 brought a 52-axle train of 390 tons in all. We attained 48½ m.p.h. at Betley Road, fell to 45 up the 1 in 177, touched 70½ before Stafford, where we slowed to 30 m.p.h., and reattained 70½ between Lichfield and Tamworth, passing Whitmore in 15 min. 25 sec., Norton Bridge in 23 min. 35 sec., Stafford in 28½ min., Rugeley in 39¾ min., Lichfield in 47½ min., and Tamworth in 52 min. 55 sec. Nuneaton was reached in 66½ min., or 5½ min. under schedule time. From Nuneaton start we passed Rugby in

Digitized by Google

19 min. 40 sec., Welton in 29 min. 10 sec., Weedon in 34 min. 25 sec. (at 70½ m.p.h.), Roade in 43 min. 25 sec., at a minimum of 61 m.p.h., Castlethorpe in 47 min. 50 sec., and Wolverton exactly 2 min. later; after this the engine was eased, as is witnessed by the times of 55 min. 25 sec. to Bletchley, 71 min. 50 sec. to Tring, 86 min. 10 sec. to Watford, 97¾ min. to Willesden, and 107 min. exactly to Euston. This latter time represented a further gain of 3 min. to locomotive, the total running time from Crewe being 173½ min. (8½ min. under schedule), equivalent to a net non-stop time of about 171 min.

The third run was one on the 4.40 p.m. from Crewe to Carlisle, behind No. 6129. This turn is worked through from Crewe to Glasgow by Crewe and Polmadie drivers alternately, a Scottish crew officiating on this occasion. With a modest 42-axle train of 310 tons all found, we made an electrifying start, attaining 71½ m.p.h. by Winsford Junction, 74 at Acton Bridge, 77½ before Weaver Junction, which we went over at 68 an hour, and then, after a minimum of 61 just beyond, 71½ at Moore troughs. Our times were 8½ min. to Minshull Vernon, 12¼ min. to Winsford Junction, 17 min. 5 sec. to Acton Bridge, 18½ min. to Weaver Junction, 23 min. to Moore, and 25 min. 50 sec. to Warrington. A bad signal check —to 15 m.p.h.—lengthened our Wigan time to 41 min., after which we mounted Boar's Head bank at a minimum of 46½ m.p.h., and passed Standish in 46½ min., and Balshaw Lane, at 69 an hour, in 52 min. 5 sec. Signal checks at Euxton and Leyland made us take 63 min. to pass Preston. But good running was made along the level from Barton, with a speed of 64½ m.p.h. at Brock, gradually rising to 67 at Galgate. Thus Garstang was passed in 75 min., and Galgate in 81½ min., Lancaster being reached in 88¾ min., or 1¼ min. under schedule. Net time was about 83½ min.

After leaving Lancaster we passed Carnforth in 8½ min., at 66 m.p.h., breasted the 1 in 135 to Burton at 51½ m.p.h., and touched 64 at Milnthorpe fell to 54 an hour at Hincaster Junction, 44½ at Oxenholme and 33 at Grayrigg, attained 66 before Tebay and mounted the last four miles at 1 in 75 to Shap Summit at a minimum of 24 m.p.h. We took 13 min. 50 sec. from Carnforth to Oxenholme, 11 min. 5 sec. from there to

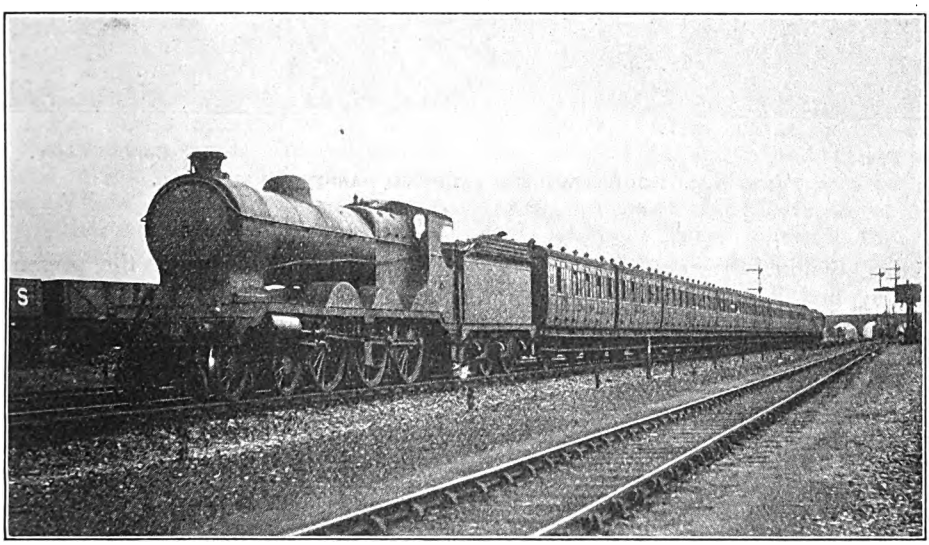


Photo.] [*Henry L. Salmon.*

LINCOLNSHIRE COAST-LONDON EXCURSION LEAVING PETERBOROUGH.

G.C. 4-6-0 No. 6068, rebuilt and superheated.

Digitized by Google

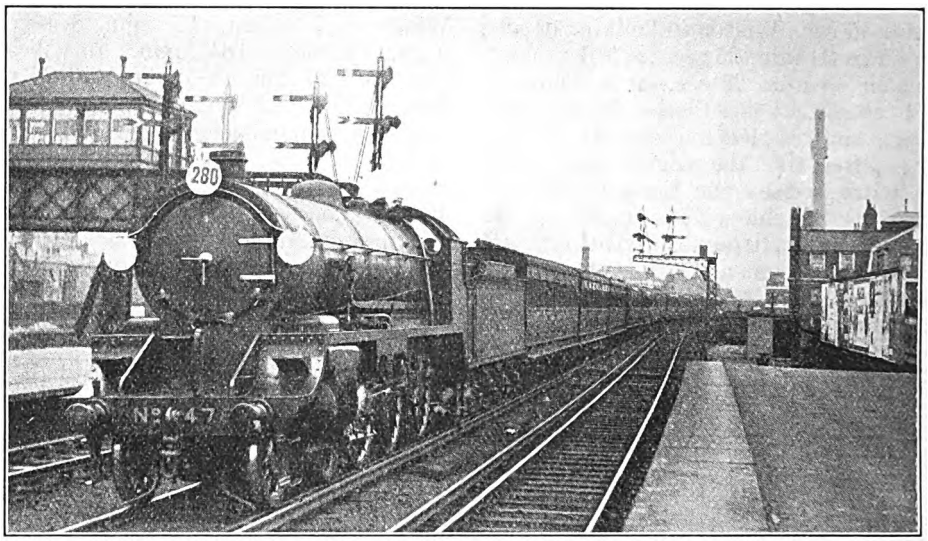
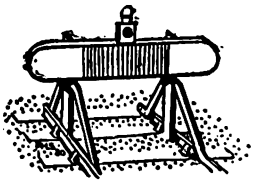


Photo.] [*H. Gordon Tidey.*

11.30 A.M. BOURNEMOUTH EXPRESS PASSING VAUXHALL.
4-6-0 mixed-traffic engine No. 478.

Grayrigg, 6 min. 40 sec. from Grayrigg to Tebay and 9 min. 25 sec. thence to Summit, passed in 49½ min. from Lancaster. From Summit to Carlisle we positively ambled, taking 14½ min. over the first stage to Penrith, and 19½ min. over the second. Total time from Lancaster to Carlisle was thus 83½ min., as compared with the schedule allowance of 86 min., and the total time to the credit of the engine between Crewe and Carlisle was about 9 min. Net equivalent non-stop time, allowing for all checks and, for a run at speed through Lancaster would be about 164 min., or still 5 min. above the pre-war schedule of the Glasgow portion of the 10 a.m. from Euston, which often loaded to a heavier figure than this in the summer time. I had intended detailing some recent runs with other classes over the West Coast main line, but space is for the present exhausted, and these latter must for the present be deferred.

Acknowledgment is due to the following writers of letters for their courtesy:—E. S. Applebaum, G. J. Aston, W. R. Coleby, G. A. Field, H. J. J. Griffith, "G.W.," E. Little, Rev. P. A. Lushington, E. W. Maybank, A. M. Reilly, C. S. Wilkinson and a writer from Sidney Sussex College, Cambridge, who appended no signature to his letter. A number of these communications enclosed details of "Royal Scot" running, but were too late for mention in the present notes. Two correspondents who wrote to ask for details of the relative performances, first of the rebuilt L.N.E.R. "Pacific" *Enterprise*, and the G.W.R. *King George V*, and, second, of the L.M.S. "Royal Scots" and the G.W.R. *Laureston Castle*, will have had their curiosity satisfied in some measure by this and the preceding articles.



Digitized by Google

Ticket-Issuing Machines on the "Underground."

OF recent years, considerable progress has been made on the associated "Underground" railways in the adoption of mechanical means of booking passengers, and 20 years ago an order was placed for a number of "pull-bar" slot-ticket machines. These were found to be useful, but of rather primitive design and noisy in operation. They were also susceptible to fraud by manipulation with spurious coins and discs. The latest type of slot machine, which has been subjected to careful tests, prints, dates, issues, mechanically weighs the coin inserted, and tests it electrically for conductivity, at the rate of a ticket a second. In addition, the machine gives change for 6d. and 1s. pieces. There is one money slot only, and whether you drop in 2d., 6d. or 1s., the ticket will be delivered, together with the proper change. This type of machine will increase the user of slot-ticket machines, as analysis shows that 90 per cent. of the passengers at "Underground" ticket offices are in possession of either the coppers for the fare or 6d. or 1s. pieces. Slot machines are also electrically attached to a special form of turnstile, as at Westminster, Bank, Earl's Court, &c., which automatically releases on insertion of coin. The passenger in the latest design will, on dropping either 2d. or 6d. or 1s. in the slot :—

(1) Receive his change.
(2) Receive a ticket printed and dated.
(3) Automatically release the turnstile, and thus obtain admission to the railway by purely mechanical means.

Experiments are also being made with a purely mechanical slot machine on the same principle as the Post Office stamp machines, and an example has been working at St. James's Park for the last two months. The machine is free from the complications of the electrical type, and occupies half the space. There is the advantage, also, that a battery of these can be moved from one point to another to deal with football crowds, aerial pageants, &c., there being no electrical connections to make.

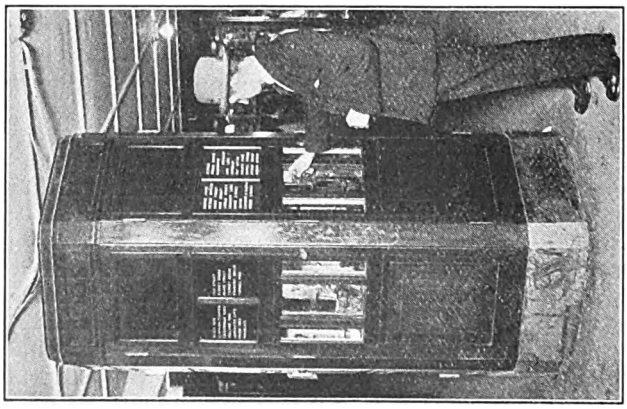
At Victoria, a number of slot machines have been assembled in the form of an illuminated kiosk, five machines occupying a circular space of 3 ft. in diameter, and shows how such machines can be assembled and made attractive and ornamental. A special type of machine is also being made for Finsbury Park subways, in order to avoid obstruction to the traffic.

The latest type of ticket-issuing machine now used in the passimeter offices prints, dates, and numbers the tickets from plain rolls of paper, and has a capacity speed of four tickets per second. A further development of this system at stations where lifts are installed is that the controlling switch and levers of the lifts are located right inside the passimeter offices, as at Angel and London Bridge stations, the clerk operating the lifts with one hand and issuing the printed tickets by the mere touch of buttons with the other.

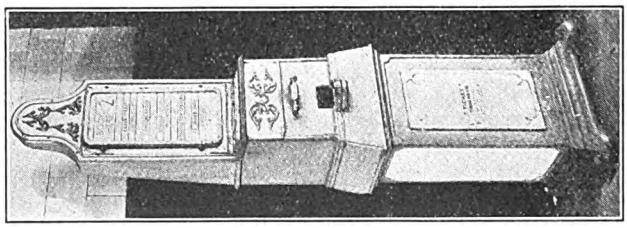
A still further development of dispensing with pre-printed tickets in the offices will be made at West Kensington station, on the District Railway, in course of rebuilding. In addition to the "rapid electric printer," described above, the office is to be furnished with an "electric table printer," the first of its kind to be tried in this country. These two machines will deal with the whole of the tickets issued at this station, with the exception of a few special issues, all the tickets being printed from blank rolls at the time of demand. The accounting of these tickets is automatic.

On several of the large railway systems on the Continent all the tickets in the offices are printed on demand, and the old-fashioned pre-printed tickets entirely done away with. These machines have the capacity for printing 1,500 different tickets, if need be. There seems to be no reason why this principle should not be carried out generally. Fifty additional passimeter machines of the self-printing and recording type are now in course of delivery to the "Underground," together with 25 of the slot type. These will increase the number of ticket-issuing

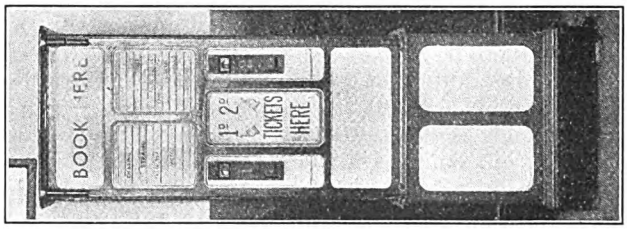
Digitized by Google



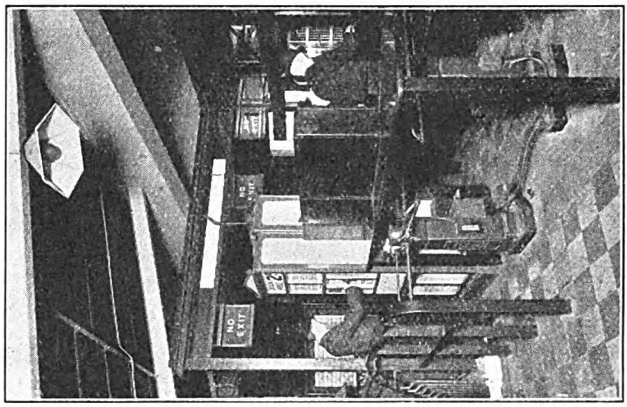
Set of Automatic Machines in Kiosk.



"Pull-Bar" Machine.



Improved Slot Machine.



Slot Machine Controlling Turnstile.

TICKET-ISSUING MACHINES ON THE "UNDERGROUND."

Digitized by Google

machines in the passimeter offices to 220, and the number of slot machines to 195, making 415 machines in daily service on the "Underground."

The number of tickets issued annually from slot machines on the "Underground" lines is 28,000,000, and from the machines in the passimeter offices 127,000,000—a total of 155,000,000. The installation of the additional machines will, it is estimated, result in a total of 180,000,000 tickets per annum, weighing 125 tons, being issued by mechanical means, representing 80 per cent. of the total tickets issued.

Careful scrutiny of comparative speed records taken during rush hours at the ticket offices during the last 10 years shows that the rate of passenger movement has increased from 600 passengers per hour per window (old method) to 1,000 per hour (new method), and in a recent test at Tooting Broadway the figure reached 1,200 per hour, a 100 per cent. increase.

CENSUS OF RAILWAY EMPLOYEES.

FROM A RETURN RECENTLY ISSUED.

A RETURN has been issued showing (1) the number of persons employed by the several railway companies of Great Britain during the week ending April 30, 1927, and (2) a comparison of the rates of pay, and also of the average weekly salary or wage and the average weekly earnings of certain selected grades during the weeks ended March 27, 1926, and April 30, 1927.

Details are given of the number employed in each of the principal grades of the four great companies and certain other selected companies, with totals for each company and for Great Britain. Male and female employees are shown separately and, with the exception of staff not employed directly, *e.g.*, staff employed by contractors, all persons in the service of the railway companies during the week of the census are taken into account.

The figures comprise the number of staff receiving salaries or wages for the full week combined with the equivalent number of full-time workers in cases where employees were paid for less than the complete week.

The average earnings of certain sections of the male adult staff were shown by the returns received to be as follows :—

	Week ended April 30, 1927. s. d.	Week ended March 27, 1926. s. d.
Staff entered at salaried rates :—		
Clerical, supervisory, &c., staff (exclusive of officers and of staff entered under ancillary businesses) ..	91 1	91 1
Staff entered at wages rates (excluding staff entered under ancillary businesses) :—		
Conciliation staff	67 2	67 2
Shop and artisan staff ..	69 7	70 2

Summary of Total Staff Employed in 1927 *and* 1926.

Name of Company.	At April 30, 1927.	At March 27, 1926.
Great Western	110,849	114,649
London & North Eastern ..	200,757	201,615
London Midland & Scottish ..	268,422	269,798
Southern	72,987	72,844
Cheshire Lines Committee ..	4,764	4,875
London Electric	7,000	6,894
Metropolitan	4,008	4,046
Metropolitan District.. ..	3,676	3,730
Midland & Great Northern Joint Committee	2,392	2,436
Somerset Joint Committee ..	1,405	1,409
Railway Clearing House ..	2,702	2,822
Other companies	4,115	4,146
Total, Great Britain ..	683,077	689,264

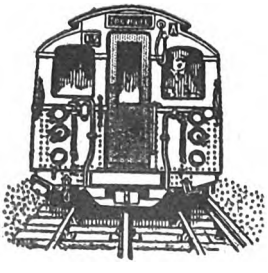
The following table gives the numbers employed in each of the principal grades and in ancillary businesses during the selected week in 1927, with the corresponding numbers for the selected week in 1926 :—

MALE STAFF.	1927.	1926.
Railway Staff :—		
Capstanmen..	1,452	1,522
Carters and vanguards ..	23,262	23,148
Carriage cleaners	7,105	7,128
Carriage and wagon examiners	4,549	4,778

Digitized by Google

Male Staff.	1927.	1926.
Railway Staff—*continued.*		
Carriage and wagon oilers and greasers	2,095	2,206
Checkers	10,921	11,406
Cranemen	532	549
Crossing-keepers	1,471	1,497
Engine cleaners	9,817	9,192
„ drivers and motormen	38,685	38,679
Firemen and assistant motormen	36,158	36,405
Foremen and chargemen ..	7,870	7,702
Guards—goods	16,614	16,566
Guards—passenger ..	8,240	8,089
Hydraulic and pumping engine staff	1,451	1,543
Labourers	28,671	29,982
Lampmen	2,337	2,390
Loaders, callers-off, ropers, and sheeters	7,020	7,320
Locomotive shed staff (excluding labourers) ..	11,123	10,995
Messengers	1,011	1,202
Number-takers	2,478	2,505
Officers and clerical staff ..	75,374	75,950
Permanent-way men ..	61,840	63,588
Pointsmen	338	379
Police staff—supervisory grades	179	196
Police staff—other grades	2,538	2,581
Porters—goods	18,816	20,431
„ passenger ..	27,200	26,971
Porter guards	527	528
„ signalmen	1,852	1,836
Shop and Artisan Staff :—		
Supervisory grades ..	3,013	3,005
Other grades (excluding labourers and watchmen)	114,842	116,388
Shunters	18,231	17,941
Shunt horse drivers ..	629	679
Signal and telegraph men	5,645	5,672
Signalmen	28,309	28,897
Signal-box lads	1,687	1,772
Stationmasters, yardmasters, &c.	6,685	7,016
Supervisory staff (other than shop and artisan, and police)	11,391	11,753
Technical staff	2,704	2,681

Male Staff.	1927.	1926.
Railway Staff—*continued* :—		
Ticket collectors	4,804	4,951
Traffic control staff ..	1,398	1,326
Watchmen	519	566
Miscellaneous grades ..	12,409	11,285
Railway total	623,792	631,196
Ancillary Businesses Staff :—		
Canal staff	1,403	1,448
Dock and quay staff ..	15,975	15,943
Marine staff afloat ..	5,407	5,306
Marine and dock staff and artisan staff	4,105	4,024
Motor omnibus and passenger road vehicles :—Conciliation staff—traffic department	493	432
Hotel, refreshment room, dining-car, and laundry staff	7,815	7,581
Total—Ancillary Businesses	35,198	34,734
Total—Male Staff ..	658,990	665,930
Female Staff.		
Railway :—		
Carriage cleaners	630	641
Clerical and technical staff	9,927	9,350
Crossing-keepers	1,523	1,531
Office cleaners and charwomen	3,407	3,392
Shop and artisan staff ..	1,260	1,320
Waiting-room and lavatory attendants	727	744
Miscellaneous grades ..	445	438
Total	17,919	17,416
Ancillary Businesses :—		
Hotel, refreshment room, dining-car, and laundry staff	6,053	5,797
Marine staff	115	121
Total—Female staff ..	24,087	23,334
Grand total, all staff ..	683,077	689,264



Digitized by Google

Westinghouse "Prestall" Vacuum Brake Cylinder.

FOR many years past vacuum brake apparatus has been so far standardised that, although it has been the subject of continual improvement at the hands of designers and inventors, such development has related mainly to constructional features and details, the main principles of operation being unchanged. There are, however, certain maintenance considerations which are capable of improvement, notably the fact that to replace a rolling ring in the brake cylinder, an operation required at more or less frequent intervals, involves a substantial degree of dismantling and the handling of parts of appreciable weight. The new "Prestall" vacuum brake cylinder, which is now being introduced by the Westinghouse Brake & Saxby Signal Co. Ltd., possesses special advantages in this connection. This device reduces very materially the dismantling necessary to replace a rolling ring—that operation is simplified in a substantial degree, the work can be done in very much less time than with the usual design of apparatus and with greater certainty, and the services of two men only are required. Further, there is only simple disconnection and reconnection to be done, risks of leakage are reduced, and the amount of deadweight per vehicle is substantially lessened.

In the case of the ordinary vacuum brake apparatus, when it is necessary to replace a rolling ring, the process involves the removal of relatively heavy parts. Moreover, even before the cylinder and piston can be removed, the brake pipe has to be disconnected and the release valve removed, while the substantial weights to be handled, and the care necessary at each stage, involve the services of two men, one at least of whom must be skilled, with a third at one stage. The third man is chiefly required to enable the heavy parts to be lowered gently as removed, and raised for replacement, while the other two men are manipulating them in other ways. It is also necessary to shore up the detachable part while the bolts are being removed. Other operations are unscrewing the piston rod, replacing the rolling ring and manipulating it into position, and skilful manœuvring to get the rolling ring to work easily and correctly, with possible difficulties in regard to the joint ring.

These operations, which usually have to be carried out several times annually, represent a substantial item in vacuum-brake maintenance, and with a view to lessening and facilitating the work to be done in this connection, reducing the deadweight carried per vehicle, and in other respects improving the brake apparatus as a whole, the Westinghouse Brake & Saxby Signal Co. Ltd. has evolved a new design of brake cylinder known as the "Prestall" vacuum brake cylinder.

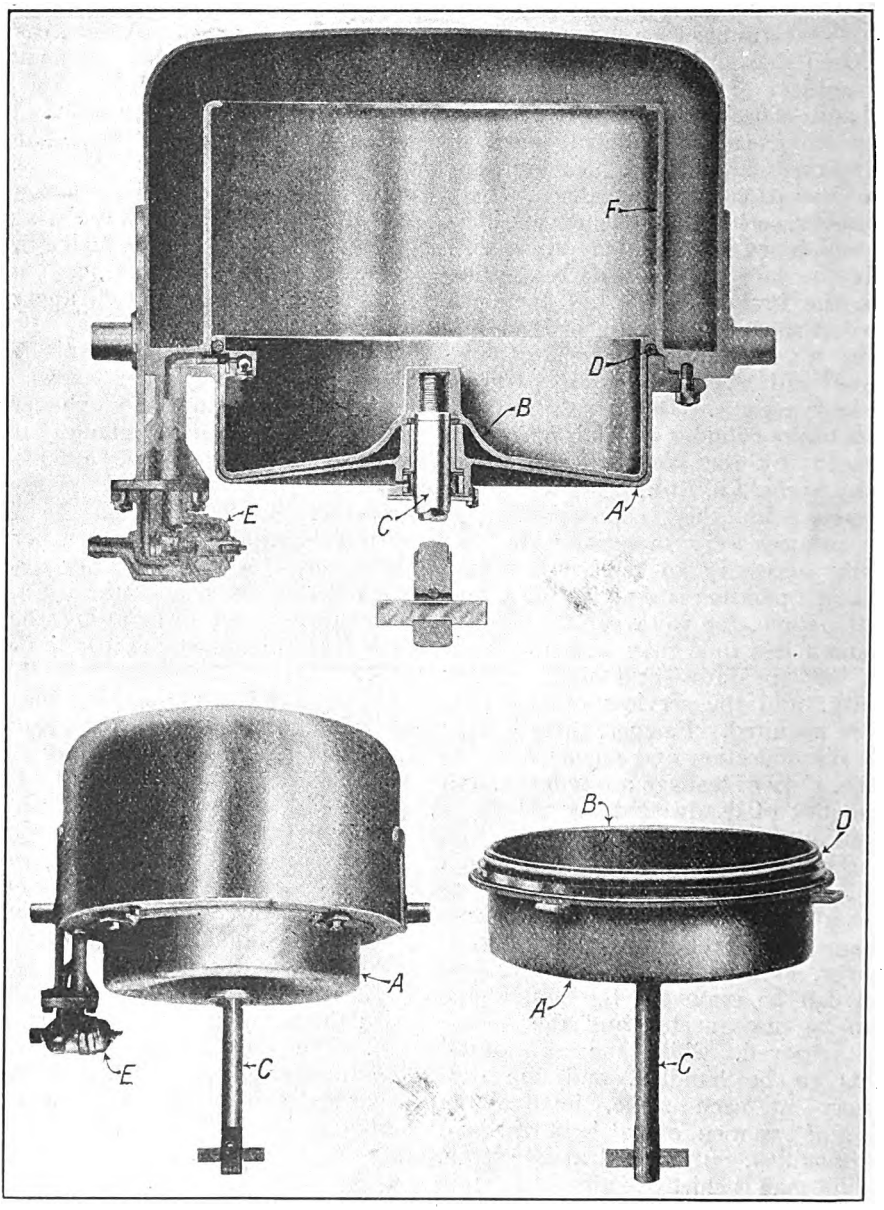
This is designed to simplify the construction and avoid the extensive dismantling hitherto involved. This result is achieved by constructing the cylinder with a detachable base, which permits of the removal of the piston for renewal of the rolling ring without the necessity for dismounting and dismantling the brake cylinder or disconnecting it from the brake pipe.

In replacing a rolling ring the base A containing the piston B and piston rod C is detachable from the cylinder F, and a new rolling ring D can be fitted to the piston without removing the piston from the base. The release valve E being fixed to the portion of the cylinder secured to the underframe, it is unnecessary to detach the valve or break the connection between the brake pipe and cylinder during the operation of renewing the rolling ring.

At this stage comparison may be made with the equipment at present in general use. The illustration shows very clearly the number of parts which have to be separated and manipulated, including the brake cylinder F^1 itself, as well as the base A^1, piston B^1, piston rod C^1 (this has to be disconnected), and the release valve E^1, all of which have to be dismantled to enable the rolling ring D^1 to be renewed.

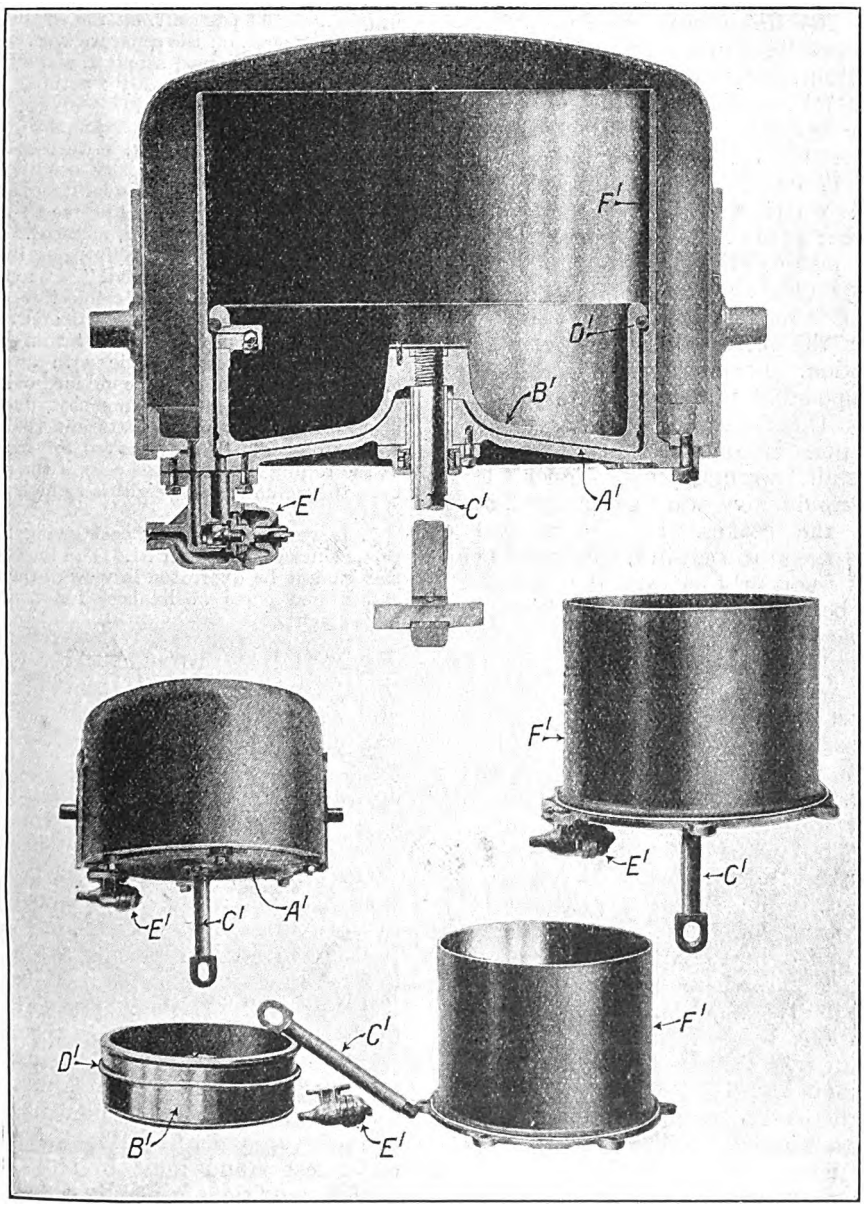
The striking reduction in weight effected by the use of the "Prestall" wrought-steel cylinder in the place of the cast-iron cylinder is aptly exemplified by the standard 18-in. cylinder, which is the most-used size. Cast-iron apparatus of this

Digitized by Google



SECTION OF "PRESTALL" VACUUM BRAKE CYLINDER, AND GENERAL VIEW OF BRAKE CYLINDER AND PARTS REMOVED FOR RENEWAL OF ROLLING RING.

Digitized by Google



SECTION OF ORDINARY (CAST IRON) VACUUM BRAKE CYLINDER, AND GENERAL VIEW OF BRAKE CYLINDER AND PARTS REMOVED FOR RENEWAL OF ROLLING RING.

Digitized by Google

size weighs 268 lb., as against 180 lb. for the "Prestall" wrought-steel apparatus, of which the parts to be detached and manhandled when renewing a rolling ring weigh 184 lb. in the cast-iron type, as against 66 lb. in the wrought-steel type.

Another, and equally important, feature of the "Prestall" wrought-steel cylinder of the combined type is that the joint between the cylinder base and casing is below or on the atmospheric side of the piston, whereas in the old cast-iron type the joint is above or on the vacuum side of the piston, where a leaky joint between the cylinder and casing would cause a loss of vacuum above the piston and render the brake inoperative or weaken its action. Furthermore, the leak would be impossible to detect without special tests. The danger of this, especially on gradients, is obvious. With the new "Prestall" wrought-steel cylinder a leaky joint would give warning by tending to apply the brakes. In the renewal of rolling rings on cast-iron combined cylinders it frequently happens that one of the studs becomes loosened in the foundation ring and causes leakage and a loss of vacuum above the piston. On the "Prestall" wrought-steel combined cylinder the accidental loosening of a stud is unimportant, since the stud tappings do not communicate with the interior of the casing. The use of "Prestall" cylinders is further advantageous because of the material saving in weight, approximately 30 per cent. in the combined type and 40 per cent. in the separate type.

"Prestall" wrought-steel cylinders can be supplied in the usual standard sizes, and are interchangeable with the old cast-iron type, all working and fixing dimensions being identical with existing standards, so that cast-iron cylinders can be removed and replaced by "Prestall" wrought-steel cylinders without any alteration whatever to suspension brackets, brake levers, or brake pipe connections. Further, standard rubber fittings are used, as well as standard ball or release valves and standard piston rods. The advantages accruing from reduced weight, consequent ease of handling, extra rigidity and durability, and lower maintenance costs are common to all "Prestall" wrought-steel cylinders.

The advantages to be derived from the use of "Prestall" wrought-steel cylinders in place of the old cast-iron types may be summarised as :—

1. Considerable reduction in weight. Approximately 30 per cent. on the combined type and 40 per cent. on the separate type.
2. Greatly increased strength and elimination of the comparatively easily fractured cast-iron parts.
3. Reduction in number of joints and elimination of certain joints which, in the cast-iron type of cylinder (when in a leaky condition), may weaken its action or even render it inoperative.
4. Increased serviceable life due to relatively high tensile, and less brittle, material.
5. For renewal of the rolling ring it is never necessary with "Prestall" wrought-steel cylinders to break the connection between cylinder and train pipe, detach the release valve, or remove the piston rod, a labour-and-time-saving feature not possible with any of the existing types of cast-iron combined cylinder.
6. Decrease in maintenance cost, due to easy accessibility of wearing parts and reduction in weight of parts to be removed for the renewal of the rolling ring. In the case of the combined type the reduction in weight is as high as 60 per cent.
7. Lower train-running cost owing to reduction in deadweight carried. The importance of this cannot be overrated in view of the actually ascertained costs of haulage for each ton of deadweight.

"Prestall" wrought-steel cylinders therefore represent a most important advance in the design and construction of vacuum brake apparatus. They are supplied in the usual standard sizes, and are interchangeable with the old cast-iron type as regards fixing dimensions, renewable fittings, &c.

On Monday, January 23, a demonstration was given at the Westinghouse Works in York Road, King's Cross, of the operations involved in replacing a rolling ring in the present type of apparatus and in the "Prestall" design. For the purpose of showing the difference between the new "Prestall" wrought-steel vacuum brake apparatus and the old standard type cast-iron apparatus, 18-in. combined cyclinders of both types were exhibited side by side on a test stand built to reproduce the service conditions generally obtained on a carriage or wagon underframe fitted with vacuum brakes.

Among those representing the Westinghouse Brake & Saxby Signal Co. Ltd. were :—

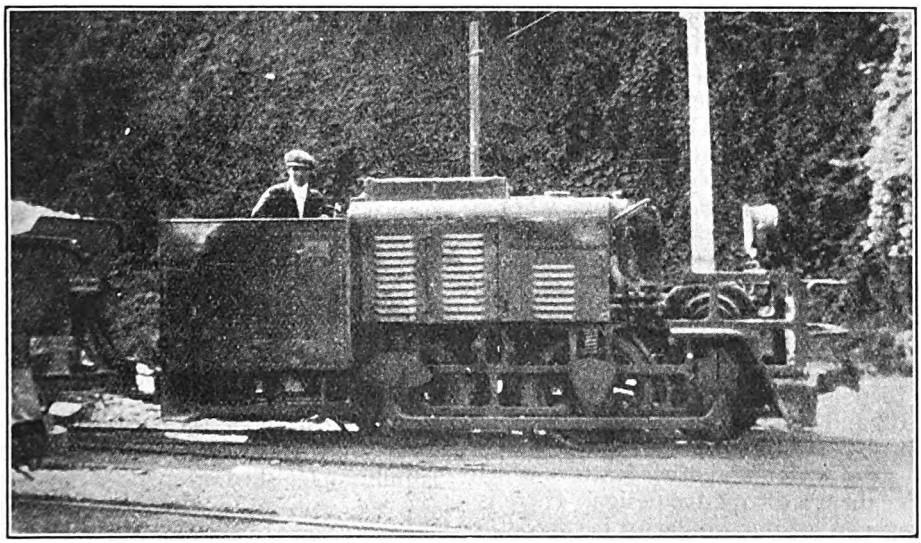
Capt. B. H. Peter, General Manager; Mr. R. Payne, Secretary; Mr. F. P. Moulden, Sales Manager; Messrs. T. Barty, W. J. Pettican,

Digitized by Google

A. J. Ruane, D. F. Brown, and R. S. Griffiths, Sales Engineers: Mr. O. J. F. Thorpe, Manager, Publicity Department; Mr. H. J. Winter, Designing Engineer; Mr. A. G. Brackenbury, Designer; and Mr. W. Woodhouse, Works Manager.

During the demonstration both cylinders were operated and then dismantled, new rolling rings substituted, and the apparatus reassembled and tested for service. In the case of the "Prestall" equipment, the operation occupied the time of two men for under three minutes, twelve operations being involved, whereas with the ordinary apparatus the whole or partial services of three men were entailed, and the time taken for 29 operations was about 20 minutes, with a much greater degree of manœuvring, as distinct from direct and straightforward work. These were, of course, demonstration times, and it is not contended that results under service conditions would always be the same. It was, however, abundantly clear that the lighter weights to be manipulated, the simplified construction, avoidance of unnecessary dismantlement, and other advantages will count for a great deal in standard maintenance of vacuum brake apparatus, while other important points are the reduction of deadweight to be carried about, the fact that the work does not entail the employment of skilled men to such an extent as at present, and that the partial services of a third man are not required.

PETROL LOCOMOTIVE IN QUARRY SERVICE.



Mr. R. Abbott sends the photograph reproduced, which shows a 0-4-0 petrol locomotive in service at the Penlee Stone Quarries, Newlyn, Cornwall. It was built by Honeywill Brothers, of Ashford, Kent, and is fitted with a 55-h.p. Pittsburg engine. There is also in service at the quarries a small 0-4-0 German-built engine, constructed about 20 years or so ago.

Digitized by Google

RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book" (5s. net) should be consulted. The thirtieth Annual Edition* (1927) *of this standard railway reference work is now published. All previous Editions are out of print.*

4-4-2T Locomotives, S.R.

Mr. Geoffrey Haly gives further details of these engines. B2 is an "I" class engine of the series 1—10, with 5-ft. 6-in. coupled wheels, 17½-in. by 26-in. cylinders, and 170 lb. steam pressure, generally similar to Nos. B595—604. The chief differences are that the latter engines were built new throughout, whereas Nos. 1—10 made use of material, including driving wheels, coupling rods, &c., from some of the Stroudley "D" class 0-4-2 tank engines; hence the shorter coupled wheelbase. The B22 engines have 6-ft. 6-in. coupled wheels, No. B21 being the only one having 6-ft. 9-in. coupled wheels. In other respects, too, there is very little in common between the B2 and B22 classes, the latter having 21-in. by 26-in. cylinders, larger boiler, with superheater, and other features which render them a distinctive design. There is, however, a greater similarity between the B22 class and the B34 class, which is really a corresponding design, with 5-ft. 6-in. coupled wheels, but not necessarily an equivalent for that reason to the B2 and B595 classes.

[Further reply to C. H. LEWIS.]

Water Troughs.

The practice of indicating the position of water-troughs at night by means of lamps is not invariable, but it is done in a good many cases; on other routes drivers must depend on their knowledge of the exact location of the troughs. The scoop is usually lowered well before the beginning of the trough. As regards the taking of water by the engines of double-headed trains, if the troughs are comparatively near together, drivers will often arrange with each other to take their water from alternate troughs; otherwise both scoops are lowered together, and the scoop of the leading engine is raised when roughly one-half of the trough has been traversed, in order to give the second engine the chance of obtaining a good supply. In any event, it is but rarely that a locomotive requires to keep the scoop lowered throughout the whole length of a trough before the tender tank is fully replenished.

[Reply to V. S. W.]

The Cromford and High Peak Line.

Supplementing information already published, Mr. H. M. Comber, of Harrogate, sends the following detailed particulars, amplifying information already given as to the 1 in 14 gradient on this line. "This gradient, which is ¼-mile long, and known as the 'Hopton Incline,' does exist, and is worked by ordinary locomotives of the 2-4-0 tank type, the load *up* the incline

Digitized by Google

being three loaded or five empty wagons, or about equal to the engine's own weight. Apart from 'rack' rails, this is probably the steepest section worked by steam locomotives on any railway at home or abroad. The gradients of the C. & H.P. are given on the attached table, from which it will be seen that trains approaching Hopton Incline have the advantage of over a mile of slightly falling gradient, and it is usual for them to 'rush' the bank; even then they occasionally fail, sometimes after having actually got their front wheels over the 'top' where the line changes from 1 in 14 to 1 in 470. Though the gradients between High Peak Junction and Hopton Top are the feature of the line, the curves between that point and Parsley Hay are a good second, the worst, at Gotham, having a radius of only 55 yards, and a super-elevation of 11 inches." He adds that no six-wheeled vehicles are allowed on the line, nor are vehicles with less than 10 in. clear above rail level. The table referred to is given above.

From	To	Rising or falling	1 in	Distance from Parsley Hay.
High Peak Junction	.. Bottom of Sheep Pasture	R	200	$17\frac{7}{8}$ to $13\frac{7}{8}$
Sheep Pasture Incline ..	.. Rope-worked	R	9	$13\frac{7}{4}$
,, ,, ..	.. ..	R	8	$13\frac{3}{8}$
Sheep Pasture Plain	.. Middlepeak	Level		$13\frac{1}{16}$
Middleton Incline	.. Rope-worked	R	$8\frac{1}{4}$	$11\frac{3}{4}$
Middleton Top..	.. Bottom of Hopton ..	F	1056	$11\frac{5}{16}$
Hopton Incline	.. (*a*)	R	**14**	$10\frac{1}{16}$
,, ...	.. ..	R	470	$9\frac{13}{16}$
Hopton Top	.. Longcliffe	F	792	$9\frac{11}{16}$
Longcliffe	.. Bloore's Siding	Level		8
,, ...	.. ,, ...	R	1660	$7\frac{11}{16}$
,, ...	.. ,, ...	Level		$7\frac{1}{8}$
,, ...	.. ,, ...	F	1480	$6\frac{3}{4}$
,, ...	.. ,, ...	Level		$6\frac{1}{2}$
Bloore's Siding	.. Minninglow	F	792	$6\frac{1}{8}$
,, ...	.. ,, ...	R	792	$5\frac{1}{16}$
Minninglow	.. Parsley Hay	R	600	$4\frac{1}{2}$
,, ...	.. ,, ...	F	1430	$\frac{1}{4}$ to 0

(*a*) The gradient at the bottom of the incline has been eased off a little and reads 1 in 60, 1 in 30, 1 in 20, and 1 in 14, to the top, the easier gradients are for a few yards only, the bulk of the incline being 1 in 14.

[Further reply to "WILBRAHAM ROAD."]

"Hammer-blow"

The term "hammer-blow" used in connection with locomotive running, indicates the suddenly-applied compressive stresses on the rails which result, at certain stages of each revolution of the driving wheels, from the rotation of the cranks and other motion parts, and the reciprocating motion of pistons and cross-heads, especially at high speeds. Locomotive balancing is intended to reduce these stresses to a minimum, but for certain technical reasons it is not practicable fully to balance the disturbing forces. Usually hammer-blow is at its worst in a two-cylinder engine; the best results are obtained with four-cylinder arrangements, but the balancing of three-cylinder designs is almost equally good. We have dealt so frequently and fully, recently, with tractive effort that we can devote no further space to the subject, except insofar as to say that, of the four types you mention, the Great Western *King George V* has the highest tractive effort (40,300 lb., at 85 per cent. working pressure) of any British passenger locomotive type.

[Reply to C. H. LEWIS.]

Old Midland Railway Station near Wadborough.

Commenting upon previous replies, Mr. P. Pantall, of Birmingham, points out that, according to a *Bradshaw* of 1844, all trains (six passenger and two goods) called at Droitwich and Spetchley, all having connections to and from Worcester by coach from Spetchley. Droit-

Digitized by Google

wich is the present Droitwich Road goods station. In a *Bradshaw* for 1859, however, the trains were all timed *via* Worcester, and stations on the direct line between Stoke Works and Abbots Wood are not mentioned. Mr. Pantall points out that the route *via* Worcester was opened in 1850 or 1852. He adds the further comment: "It is a matter of interest that both northern and southern connecting lines are the property of the G.W.R., though hardly used at all by them. The northern section, Droitwich-Stoke Works, is, I believe, only used by the G.W.R. for goods and mineral traffic to Stoke Works (Salt Union Limited Works). The short southern connection, Norton Junction-Abbots Wood Junction, is not used by the G.W.R., as far as I aware."

[Further reply to Rev. W. P. GILPIN.]

Non-Stop Runs.

Mr. C. R. Prescott directs our attention to a "Pertinent Paragraph," published in the February, 1924, number, in which particulars were given of the run of 438 miles without stop claimed to have been made in 1876 from Jersey City to Pittsburgh. This was based upon a description for which authority was claimed, given in our American contemporary, *Railway and Locomotive Engineering*. The run was made as an advertising stunt for an opera company travelling from New York to San Francisco. Special arrangements had to be made for coal and water supplies, carried in a baggage and combination car. The load was not, of course, heavy, though an old 4-4-0 was used. The time was 10 hrs. 5 mins., average 43½ m.p.h. This run, which we had forgotten for the moment, was not, however, made in ordinary service, and it was only such runs that we had in mind when writing our previous reply.

[Further reply to W. T. HOECKER.]

Locomotive Workings on G.W.R.

We fear that it would be quite impossible to explain all the apparent peculiarities of locomotive workings, whether it be on the G.W.R. or any other system. We are aware that on the Bristol service it is not uncommon to note double-headed expresses, occasionally worked by two "Castles" in combination, with comparatively light loads, but you may take it as certain in such cases that the pilot engine is merely being worked through in this way as a matter of convenience, rather than congesting the time-table with an independent light engine working. We cannot say if the "Kings" are worked between Swindon and Bristol, but they certainly work between Paddington and Swindon, being frequently seen, for example, on the 10.45 a.m., and 3.15 p.m. down Cheltenham expresses. These latter are comparatively light duties which generally follow repairs or overhauls.

[Reply to "CAERPHILLY" and "PAIGNTON."]

L.M.S. (Midland) Loads.

We are given to understand that L.M.S. trains with exceptional loads leaving Bristol (Temple Meads) are stopped, if necessary, at the junction with the St. Philips line for rear-end bank engine assistance up Fishponds bank, and this was doubtless the method of working in the case you mention. Similarly, trains with heavy loads for the South Wales or Birmingham direction are given assistance, if necessary, up Ashley Hill bank, from Stapleton Road to Filton Junction. As an *occasional* measure, Great Western two-cylinder 4-6-0 engines are now allowed over the Midland line between Yate and Standish Junction, and this will explain the appearance of No. 2984 on the 2.35 p.m. from Bristol to Birmingham, as seen by you recently.

[Further reply to R. A. ATTHILL and F. J. ARTHUR.]

Compound Locomotives.

As to whether or not there is excessive back pressure resulting from the exhausting of steam from one or two high-pressure cylinders into a low-pressure receiver and cylinders, as compared with the direct exhaust from simple cylinders into the chimney must depend on the relation between the volume of high- and low-pressure cylinders respectively, or on whether the low pressure cut-off bears the right relation to the high pressure cut-off. If these relations are correct, there should be no excessive back pressure; the remarkable efficiency figures obtained with the Midland three-cylinder compounds of the L.M.S. is sufficient proof that no difficulty of this kind need arise with compounding.

[Reply to F. J. THOMAS.]

Digitized by Google

R.O.D. Locomotives.

Your query is not very explicit. Many different types of locomotive were used by the R.O.D. during the war, of which the most numerous class on the Western Front was ultimately the well-known 2-8-0 Great Central type. Prior to the war, this class of locomotive had been used on no line other than the G.C.R., but the large numbers which were built during the later war years, ultimately found their way on to most sections of the L.N.E.R., the Western "A" Division of the L.M.S., and the G.W.R., on all of whose systems they are still employed. The engines are now dropping out of service on the L.M.S., but their tenders are being used by various engines of the "Claughton," "Prince of Wales," and "George the Fifth" classes.

[Reply to E. HOWARD CARTER.]

Southern Railway Locomotive Numbers.

As we have several times stated, the locomotives of the respective sections bear their old numbers, or when allocating them to one section or another the letter A (Ashford), B (Brighton), or E (Eastleigh)] indicates the section. Isle of Wight locomotives are numbered in a "W" series, engines sent over from the mainland being renumbered as necessary. The highest number in each section is governed by the number of engines concerned. We have not heard of any engines numbered without a section letter. These can only be engines of higher numbers than any as yet allocated to sections. Engines on the duplicate list have "O" prefixed, but retain also their section letter.

[Reply to E. MAXWELL.]

Parkside Station, L.M.S.R.

"Nemo" writes as follows :—"The station at Parkside, between Newton-le-Willows and Kenyon Junction, does not now exist, but on reference to *Bradshaw* dated April, 1874, pages 162–3, I find the station "Parkside" and the following trains calling thereat from Manchester, weekdays, 7.0, 1.50, 3.50 and 6.55, Sundays at 8.45, 6.15 and 9.20, taking about 40 minutes to reach Parkside, and from Liverpool at 6.0, 12.0, 2.50, 6.10 on weekdays, and on Sundays at 7.0, 8.15, 6.45 and 8.30. I might mention that outside the old station is a memorial tablet to the late Rt. Hon. W. Huskisson, M.P., who was killed on the occasion of the opening of the line between Liverpool and Manchester on September 15, 1830."

[Further reply to F. J. BUCKLEY.]

A Distant Signal Problem.

We have no direct knowledge of the situation at Bidston, on the Wirral section of the L.M.S.R., but, from the particulars given by you, we would suggest that the duplication of distant signals is due to the presence of the level crossing between the two signal boxes. This involves the home signals for the routes from Upton and from Leasowe being followed by the starting signal at the station, which safeguards the level crossing. A train at the platform has, therefore, to pass the home signals where distant indications are given, so that it is desirable to provide local distant indications at that point. The local control for the respective sets of signals would, of course, be covered by appropriate slotting.

[Reply to "F. W. N."]

S.R. Locomotive at Maidenhead.

Information sent by Mr. C. Downey explains apparent discrepancies between the particulars given by various correspondents. According to Mr. Downey the engine comes from Basingstoke sheds and works (double-crewed), 7·38 a.m. Basingstoke to Southampton Terminus; 9.54 a.m. Southampton Terminus to Reading, G.W.R.; 2.25 p.m. Reading to Maidenhead; 3.12 p.m. Maidenhead to Reading; 4.53 p.m. Reading to Southampton Terminus; light to Eastleigh; 8.20 p.m. Eastleigh to Basingstoke. Both Southern and G.W. engines work between Reading and Basingstoke, and the run to Maidenhead, is stated to be made to balance G.W. engine working.

[Further reply to MEYRICK J. H. CRAMB.]

G.E. Section Locomotives, L.N.E.R.

Tractive effort, at 85 per cent. working pressure, of the G.E. 4-6-0 engines of the "8500" class, is 22,000 lb., and of the "Super-Claud" 4-4-0 engines, 17,100 lb. The boiler barrel of the latter engines is 5 ft. diameter, not 6 ft., the limited loading gauge dimensions on the G.E. Section mak-

Digitized by Google

ing it necessary to cut down the height of the boiler mountings, with the result that these engines look larger than they really are. The weight of the "Super-Clauds" without tender is only 55½ tons, of which 36½ tons rank for adhesion.

[Reply to LIEUT. F. T. MASON.]

G.W.R. Locomotives.

At one period, several types of name and number plates were tried on the Great Western Railway, and some of the engines of that period have combined number and name plate. It is, presumably, one of these engines which you have seen. Obviously, the engines cannot have been built at Swindon in 1821, and, presumably, that is the works number. If we remember rightly, the engine in question is a small-wheeled mixed-traffic 4-4-0. This class, by the way, is particularly notable for the variety in name and number plates.

[Reply to "PADDINGTON."]

L.N.E.R. Lines in Glasgow District.

If the articles mentioned by you do not give the dates desired, we regret that we cannot add to the information beyond the particulars given. It is possible, however, that a reader can give the date when the L.N.E.R. line from Partick to Dalmuir *via* Clydebank was opened. We have no gradient profile of the Glasgow-Helensburgh section, but understand that, like many routes of a similar character, it has not only frequent curves and junctions, but moderately steep gradients here and there.

[Reply to "NORTH BRITISH."]

S.R. 4-6-0 Locomotives.

As we have more than once explained, the "King Arthur" class 4-6-0 locomotives are entirely new engines and are, therefore, not rebuilds, though they may rank as replacements of Drummond 4-6-0 locomotives which bore the same numbers. Some of the latter are, however, still at work on the duplicate list, their numbers being prefixed by a nought, but most of them are withdrawn from service, though we are doubtful as to whether they have been actually scrapped as yet.

[Reply to R. E. G. READ.]

Earl Haig's Funeral Train.

We understand that the body of the late Earl Haig was sent from Waterloo station on its journey to Edinburgh owing to the fact that Waterloo is conveniently adjacent to Westminster Abbey, and that the journey by road thereto was relatively simple as compared with that which would have been entailed had the body gone from King's Cross, Euston or St. Pancras. The special train, no doubt, travelled *via* Addison Road to Willesden Junction, and thence to Princes Street, Edinburgh *via* the L.M.S.R.

[Reply to G. W. SPINK, D. C. L. POTTER and GEOFFREY ELLIS.]

Feed-Water Heaters.

4-6-0 engines Nos. 8505, 8517 and 8525, of the G.E. Section of the L.N.E.R., also N.E. Section 4-4-2 No. 2206 are fitted with A.C.F.I. feed-water heaters and pumps located on the top of the boiler barrel, between chimney and dome. We are interested to note that two passenger train sets fitted with the vacuum brake are operating on the G.E. Section, and that G.N. 2-6-0's Nos. 4647 and 4662 are stationed at Southend.

[Reply to "HOCKERILL" HALT D.E.R., "MONK BAR" and H. A. J. PEARMAIN."]

G.N.R. Record Run.

We have no details of the run made on August 4, 1895, to convey a doctor from London to Peterborough to attend an urgent case, when the 76½ miles were covered in 68 minutes. We understand, however, that it is authentic, but as the load was two coaches only it has but little interest from the locomotive performance point of view. No information is available as to the engine concerned.

[Reply to C. LAUNDY.]

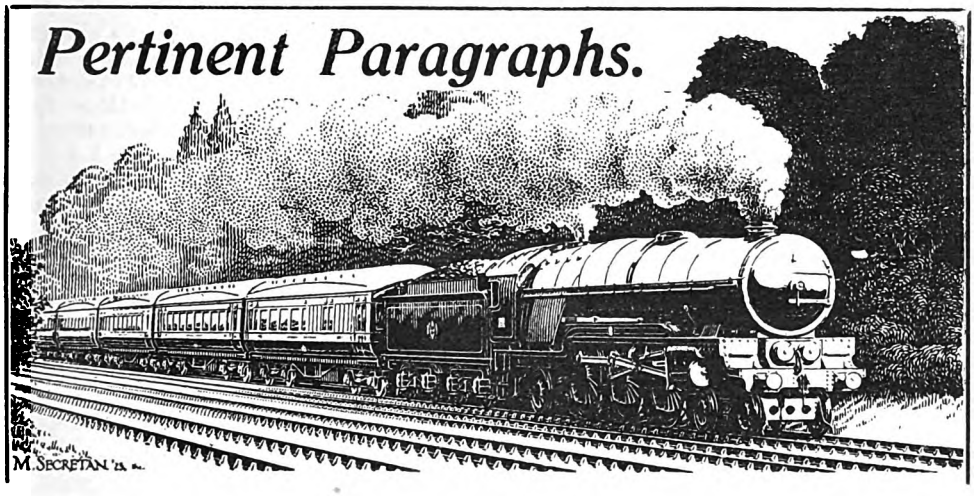
Ancoats Junction.

The map reproduced on page 88 of the February number was based on the R.C.H. official map and has been checked therewith and found to be correct in regard to this junction. It may be that the signal boxes in question have been renamed, but as to this we have no knowledge.

[Reply to W. J. C.]

Digitized by Google

Pertinent Paragraphs.



Education of Permanent-Way Men.

SPEAKING at the recent annual winter dinner of the Permanent Way Institution, Sir Herbert Walker, General Manager, Southern Railway, suggested that the Institution might usefully consider the training of men employed upon the upkeep and maintenance of permanent way, those who should be the future gangers and ultimately inspectors and supervisors in that great department. Big strides had been made in the better maintenance of their lines and a high measure of standardisation had been achieved. But greater speeds and increased axle loads called for a higher standard of efficiency, from the chief engineer downwards through the divisional engineer to the inspector and ganger. On the other hand, increased prices of materials, the higher standard of wages and the reduction of hours all pointed to the need for the strictest economy being exercised. It was, therefore, more than ever necessary that the technical knowledge of the permanent-way supervisory staff should be of the highest possible standard, and they looked to the Institution to give a lead in this respect. The accepted practice at present was to recruit the supervisors from the ranks of the practical men. Unless, however, both practical and theoretical knowledge were combined, they were not getting the best material. Mr. G. Ellson, Chief Engineer, Southern Railway, and President of the Institution, later pointed out that at present £13,360,000 was expended annually on permanent way; nearly three-fourths of this was on repairs; 58,000 men were employed, excluding 800–900 men on the supervising staff, while 18,500 men were gangers or sub-gangers. There were instructional classes on other subjects, and he thought that a good case could be made out for evening classes for permanent-way men, as to which members of the Institution could render good service.

Upper Quadrant Signalling on the L.M.S.R.

HITHERTO, semaphore signals working in the upper quadrant have been employed almost exclusively in connection with power and automatic signalling, in regard to which the system possesses important mechanical advantages which are utilised in many such installations. There have also been a few instances of mechanically-worked semaphore arms arranged to move in the upper quadrant, though most of these are employed to meet particular requirements, as, for example, in instances where the headway available does not allow for the downward movement of an arm. It is, therefore, with particular interest that we read in the January issue of the *LMS Magazine*, on the basis of an article contributed by Mr. W. J. Sadler, of the Signal Superintendent's Office, Derby, that it is intended to introduce upper quadrant signals into standard L.M.S.R. practice, this applying, presumably, to both mechanical and power installations. An important advantage of the upper quadrant signal is that the balance weights otherwise necessary can be substantially reduced, while the arm itself naturally tends to fall to the danger position in the event of breakage of connections or other failure. The arm itself can also be made relatively light, a neat design of spectacle is practicable, and the mechanical effort entailed upon the signalman is correspondingly reduced. We understand that such signals will shortly be brought into regular service, and that further new works, alterations and renewals will include the same feature.

Digitized by Google

Proposed Greenisland Loop.

THE London Midland & Scottish Railway Company has given notice of its intention to promote, in the Parliament of Northern Ireland, a Bill relating to the Northern Counties Section. One of the most prominent proposals in the notice is the construction of the "Greenisland loop" of 1 mile 28 chains in length, and of two deviations in connection therewith. At present all trains from Belfast to Londonderry and Portrush and *vice versa* have to reverse at Greenisland, about 6¾ miles from Belfast, and the notice appears to contemplate the construction of a line which will enable trains to proceed direct, with a consequent saving in time and engine power, and a simplification in working. In the original lay-out of the line, the engineers adopted the existing route with its greater length and attendant delays, in order to avoid the adjacent mountains, the tunnelling of which would have been a heavy expense. The intended Bill will also extend the powers given by the Act of 1924 for dealing with superfluous lands and for authorising the erection and disposal of shops, flats, offices, &c., on railway premises. No fresh capital powers will be taken by the Bill.

Road Transport for Railway Passengers.

A HOBART message states that considerable passenger traffic has been regained by the Tasmanian railways owing to the enterprise of the Railway Commissioner in providing for the free transport of passengers between the railway station and their homes, boarding-houses, or hotels. Intending passengers simply book their seats at the Tourist Bureau and notify their address. They are supplied with coupons, which they hand to the driver of the motor-car when he calls to pick them up. Passengers coming to Hobart by rail are likewise given coupons at a suburban station on the main line, and when they reach Hobart are carried free to their homes or hotels. The car owners take their coupons to the Railway Department and obtain an allowance of 1s. per passenger.

Locomotives of the late North Staffordshire Railway.

IN view of certain corrections pointed out by readers, the author of the articles under this heading, published in the August, September and October issues, writes as follows:

"The following is a list of the corrections of the mistakes which have arisen in my article of 'The Locomotives of the late North Staffordshire Railway.' No. 72 should not be included on the list of Class E locomotives on page 197, as it was built by Sharp Stewart, as stated on page 198. No. 11, on page 101, given as a 2-4-0, should read 71 and not 11 as stated. No. 63 should not appear in the first list of 0-6-0 saddle tanks. The reference to the RAILWAY MAGAZINE of April, 1899, is to the whole class, just as much as to any one particular engine. No. 67, mentioned as a class B. 2-4-0 tank engine, later rebuilt as a 2-4-2 tank engine, should read No. 61, as stated on page 201. No. 54, a 0-4-4 tank of the 'M' class, was built in 1920, and not in 1908. I should like to thank all readers who have been kind enough to comment on and suggest improvements to this article on the N.S.R., because every fact helps to complete the records of a line on which very little has ever been written, and on which there is much to learn."

Automatic Train Control and Railway Electrical Equipment.

THE Minister of Transport has appointed a committee to review the recommendations made by the Automatic Train Control Committee of 1922, and to consider and report what alterations, if any, should be made in that committee's conclusions and recommendations, having regard to the developments that have taken place since that date.

The investigations of the new committee will include the consideration of the non-contact type of train control, *i.e.*, inductive or wireless systems. No further examination, however, will at present be made of devices already considered by the Ministry of Transport involving contact between apparatus on the track and on the locomotive respectively.

The membership of the committee is as follows:—

Chairman—Colonel Sir John W. Pringle, C.B., Chief Inspecting Officer of Railways.

Mr. H. C. Charleton, M.P., National Union of Railwaymen.

Mr. C. B. Collett, O.B.E., M.Inst.C.E., M.I.Mech.E., Chief Mechanical Engineer, Great Western Railway.

Mr. E. C. Cox, C.B.E., Operating Superintendent, Southern Railway.

Mr. H. N. Gresley, C.B.E., M.Inst.C.E., M.I.Mech.E., Chief Mechanical Engineer, London and North Eastern Railway.

Lieut.-Col. G. L. Hall, O.B.E., Assistant Engineer, Southern Railway.

Lieut.-Col. A. H. L. Mount, C.B.E., Inspecting Officer of Railways.

Mr. A. Newlands, C.B.E., M.Inst.C.E., Chief Engineer, London Midland & Scottish Railway.

Mr. E. A. Wilson, O.B.E., M.Inst.C.E., Engineer, Metropolitan Railway.

Secretary—Mr. C. Tilden Smith, Railway Inspection Department, Ministry of Transport, 7, Whitehall Gardens, S.W.1.

The Minister of Transport has also appointed a committee with a similar object to review the recommendations made with

Digitized by Google

respect to the standardisation of the electrical equipment of railways and other matters by the Electrification of Railways Advisory Committee of 1921.

The membership of the committee is as follows :—

Chairman.—Sir John W. Pringle, C.B., M.Inst.C.E., Chief Inspecting Officer of Railways.

Sir John Aspinall, M.Inst.C.E., M.I.Mech.E., M.I.S.I., D.Eng.

Mr. A. R. Cooper, M.Inst.C.E., London Electric Railway Company.

Lieut.-Col. F. A. Cortez Leigh, T.D., M.Inst. C.E., M.I.Mech.E., M.I.E.E., London Midland and Scottish Railway Company.

Sir Philip Dawson, M.P., M.Inst.C.E., M.I. Mech.E., M.I.E.E.

Sir Alexander Gibb, G.B.E., C.B., M.Inst.C.E., M.I.E.E.

Mr. H. N. Gresley, C.B.E., M.Inst.C.E., M.I.Mech.E., London and North Eastern Railway Company.

Mr. Herbert Jones, M.I.E.E., Southern Railway Company.

Mr. C. H. Merz, M.Inst.C.E., M.I.E.E.

Sir Philip A. M. Nash, K.C.M.G., C.B., M.Inst.C.E., M.I.E.E.

Mr. Roger T. Smith, M.Inst.C.E., M.I.E.E.

Sir John Snell, G.B.E., M.Inst.C.E., M.I.E.E.

Secretary.—Mr. Thomas L. Paterson, 6, Whitehall Gardens, S.W.1.

Signalling Developments on the "Tilbury" Section, L.M.S.R.

THE L.M.S.R. has practically completed the installation of automatic signalling on what is one of the most difficult stretches of line in the London area—that between Bow Road and Barking, on the "Tilbury" section. Already a saving of 6 minutes has been made possible between Bow Road and Upton Park, the portion of the line equipped to date, and on March 5 a certain number of additional trains will start running. The alterations, when complete, will admit of 40 trains an hour being operated in each direction.

In re-signalling this section a number of special problems have been involved, in that while advantage is taken of the short sections usual with automatic signalling and account is taken of the greater braking and rapid accelerative capabilities of the L.M.S. and "District" electric trains, it has been necessary to provide also for the movements of ordinary and express passenger and goods trains, in some cases on the same lines, though the section is actually four-track throughout. There are several junctions at which the steam trains can cross to the electric lines, and it has been necessary to leave a control of the signals on levers in the existing signal cabins. These junctions are not used during the morning rush hours.

Another difficulty is that at certain times of the day, and all through the night, a considerable number of freight trains also use the electric lines. These goods trains have not, of course, the braking power of electric trains, and a system had to be arranged allowing a greater distance between the freight train and the next train in advance. To do this a special instrument which provides automatically for the extra distance required has been installed. The passage of the freight train automatically restores the line to its normal working, so that no delay is caused to following electric trains.

The work has entailed the provision of 43 new signals and 41 "fog repeater" signals; 74 new track circuits have been brought into use. Train stops are also used. The work has been carried out by the L.M.S.R. Electrical Department Staff, utilising apparatus supplied by the Siemens & General Electric Railway Signal Co. Ltd., and the Westinghouse Brake & Saxby Signal Co. Ltd.

Railway Steamers in Ireland.

MR. C. J. COGHLAN writes :—"Probably very few readers of the RAILWAY MAGAZINE are aware that Irish railway companies own any steamers. They would be surprised to know that at the amalgamation of the Irish Free State railways in 1924, the Cork, Blackrock and Passage Railway owned three steamers, and four locomotives, rather unique in its way. The vessels were :—

Albert, 1881. 140 ft. 5 in. by 15 ft. 5 in. by 7 ft. 8 in. 54 net, 92 gross. Paddle.

Queenstown, 1892. 92 ft. 3 in. by 16 ft. 6 in. by 6 ft. 6 in. 43 net, 85 gross.

Rostellans, 1891. 94 ft. 6 in. by 15 ft. 6 in. by 6 ft. 4 in. 47 net, 82 gross.

In 1925 the *Queenstown* was sold to William Jones, Docks, Lydney, Gloucestershire, and the *Rostellan*, in 1926, to Joseph McSwiney, Passage W., Cork.

The G.S.W.R. owned the small vessel *Coey* of 7 gross tons and 4 net, built in Barnstaple in 1881. The dimensions were 39 ft. long by 7½ ft. in beam. It was disposed of in 1924. The same company also owned the *Kestral*, built in Deptford, Kent, in 1857. Tonnage: 10 net, 32 gross; 64½ ft. in length by 12½ ft. beam.

In 1924, the Londonderry and Lough Swilly Railway acquired from Mr. John McFarland, Abeyfoyle, Londonderry, the paddle steamer *Lake of Shadows*. This vessel was built in Preston in 1905, and has a net tonnage of 61, and gross 140. It is 120½ ft. in length and 20 ft. in beam.

Concrete Roadbed for Railway Track.

MANY experiments have been made with designs of concrete and ferro-concrete

Digitized by Google

sleepers, but we gather from a paper read recently before the American Maintenance of Way Club by Mr. Paul Chipman, of the Pere Marquette Railway, U.S.A., that an experimental section of concrete roadbed has given good service under extended test. It is 1,326 ft. in length, and is inserted in one track of a double-line section of a main route near Detroit. It consists of 34 slab sections, 21 in. thick, 10 ft. wide, and 39 ft. long. In addition to ordinary reinforcing bars a light steel truss is embedded in the concrete directly beneath each rail. The upper chord of this truss consists of two ¼-in. by 4-in. steel plates placed vertically with the upper edge slightly below the surface of the concrete. These trusses are connected with each other at intervals by brace frames and adjustable tie rods. Attached to the steel plates at intervals are steel stirrups for the rail fastenings. The rails are held in place by clips bolted to these stirrups. On the basis of the first year's service it was reported that there had been no undue disintegration of the concrete beneath the rails, nor any undue battering of the rails themselves. Trains rode on the section quite smoothly, so that there were no indications of deleterious effects, though the section was too short to provide conclusive evidence. As to the joints, "it would be hard to find a piece of ordinary track in use a year, under like traffic, that would show a better record."

The Railway Situation in China.

SENDING two photographs, one of which is reproduced, Lieut. R. Bucknall, writing from Shanghai, states as follows:—

"On Tuesday, August 16, a British aeroplane made a forced landing in Chinese territory. Unarmed R.A.F. personnel were sent to remove the machine. They had withdrawn all except the actual planes, when the Chinese authorities intervened, threatening force if the British did not withdraw. Being unarmed, the British withdrew. An ultimatum was then sent by the British to the Chinese, to the effect that 'if you do not return the parts of our aeroplane at once, we will cut your railway.' No further developments occurred, so on the afternoon of Wednesday, August 17, the railway was cut. The aeroplane wings were at once returned, and so the line was repaired the next morning, when everyone shook hands all round!

"The portion of the line which was cut was the loop of the Shanghai-Hangchow-Ningpo Railway, which runs from Shanghai South, round the edge of the Settlements, to Shanghai North, thus connecting with the Shanghai-Nanking Railway. It was cut immediately south of the girder span over the Soochow Creek, and the level-crossing over the Jessfield Road, which is some four hundred yards north of Jessfield station. The two photographs show views of the cut in both directions. British troops stood at

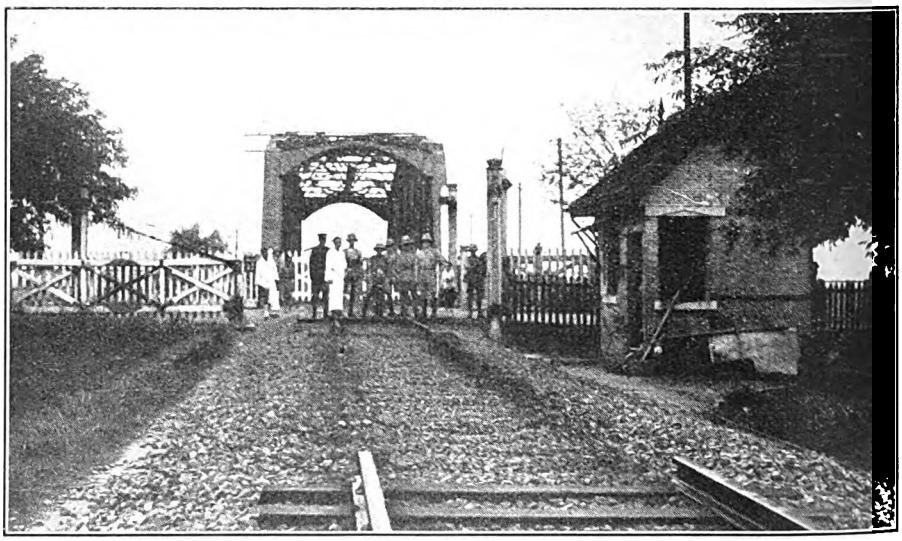


Photo.] **WAR DAMAGE TO RAILWAYS IN CHINA.** [*Lieut. R. Bucknall.*

Jessfield Road Level Crossing and Bridge over Soochow Creek.

Digitized by Google

arms, and mechanically drawn field-guns were brought up to cover the line at point-blank range, in both directions.

"The work was carried out by Sappers and Miners, who knocked off the fish-plates and then prised a complete length of rails, with their sleepers, over in a somersault, and down the embankment on the west side. The ends of the sleepers can just be seen on the right of the photograph looking towards Jessfield station. Very considerable inconvenience was caused to the Chinese, who at that time had large bodies of troops arriving at Shanghai North from Nanking, who were unable to get away to the south. No attempt was made to repair the line!"

The Locomotive Booster in Britain.

THE paper read by Mr. O. Bulleid before a meeting of the Institution of Locomotive Engineers on January 26 is of value to railway mechanical officers generally as showing what can be effected in the way of increasing the tractive power, and consequently the starting capacity, and acceleration of locomotives by the use of the device known as the locomotive booster. This auxiliary engine is extensively employed in the United States, and in this country has been applied to two separate types of locomotives on the L.N.E.R., where, as the results given by Mr. Bulleid showed it has, after modification of certain details of the mechanism, given very satisfactory results. One of the problems associated with the application of auxiliary power by this method is that of smoothly effecting the cutting in and out of the mechanism as required, and in this connection the ratio of gearing, of course, plays a very important part. It is of interest to note that in the case of the L.N.E.R. Atlantic-type engine fitted with booster, after the gear ratio had been lowered, it was found possible to engage the booster at considerably higher speeds than heretofore, whilst the time occupied in effecting the full sequence of operations in cutting in and out of action was reduced to about one-third of what it had previously been. The tests made on the L.N.E.R. with the Atlantic-type booster express engine were of an exacting kind, in one case consisting of the engine having to re-start a train of 18 bogie coaches weighing 535 tons on a 1 in 100 gradient on a curve, and the fact of its having done this without undue difficulty, with a total tractive effort of 25,840 lb., was admittedly a good performance. It would, of course, have been wholly impossible for an engine of this class to have re-started such a train under these conditions without the aid of an auxiliary engine of the booster type.

Southern Railway Programme for 1928.

THE directors of the Southern Railway have authorised expenditure exceeding £2,000,000 to be spent on locomotives and trains, new works, improvements at stations, new steamers, &c. These developments, set out below, will help to provide work for numerous British firms, and are entirely apart from the £3,750,000 scheme of suburban electrification on the Central Section, the first stage of which will be opened during this month.

Nearly £1,000,000 will be spent on new locomotives and rolling-stock during the present year, the bulk of the work being carried out at the railway's works at Eastleigh, Ashford, Brighton and Lancing. Thirty-eight new engines are under construction, including ten of the "Lord Nelson" class, to be named after the following "sea kings":—

Lord St. Vincent.	*Howard of Effingham.*
Lord Howe.	*Sir Francis Drake.*
Lord Rodney.	*Sir Walter Raleigh.*
Lord Hood.	*Sir Richard Grenville.*
Lord Hawke.	*Martin Frobisher.*

New corridor trains are being built at Eastleigh for use on the services between London and Plymouth, Ilfracombe, the Kent Coast, Eastbourne, Deal, Ramsgate, and Folkestone, while others are being constructed for the Southampton boat traffic and the Bournemouth services. Ashford works will be mainly employed on the construction of 1,650 12-ton open goods wagons (costing over £250,000), while other vehicles to be built include general saloons for race and school traffic, general-utility vans, refrigerator vans, machinery trucks, &c.

Station improvements and other works will be carried out at Selhurst, Hoo Junction, Angerstein Wharf, Reading, Medina Wharf, Cowes, Isle of Wight, Kew Bridge, Hounslow, Callington, Horsham, Kent House-Beckenham Junction main line widening, Tulse Hill, Bournemouth Central, Padstow, Barnham Junction, Brighton, Newhaven, St. Leonards (West Marina), Ashford Works, Seaton, Chislehurst-Orpington section, Swalecliffe (nr. Whitstable), Plumpton.

The new steamer *Worthing*, which is being constructed by Wm. Denny & Bros., of Dumbarton, will, it is hoped, be available for service on the Newhaven-Dieppe route early this summer. This vessel, which will cost about £175,000, is being built on similar lines to the *Isle of Thanet* and the *Maid of Kent* on the Dover-Calais service, and will include much greater covered accommodation for second-class passengers. The same firm have also received an order from the Southern Railway for another motor ferry vessel for the Portsmouth-Fishbourne (Isle of Wight)

Digitized by Google

service. She will cost £17,500, and will include numerous improvements. Other vessels in course of construction for the Southern Railway include two passenger paddle steamers for the Portsmouth-Ryde (Isle of Wight) service, the *Merstone* and *Portsdown*, which are being built by the Caledon Shipbuilding & Engineering Company. A new cargo boat, the *Deal*, is also in course of construction.

The £13,000,000 Docks Extension Scheme at Southampton is proceeding, and during the past six months a considerable amount of mudland near the Royal Pier has been reclaimed. The dredging of the deep-water approach channel and the reclamation of about 170 acres of mudland will be started within the next few months.

Making Up Time.

In the course of a recent journey from King's Cross to Doncaster and back, travelling in each direction by the day Sunday Scotch express, Mr. R. A. H. Weight recorded "remarkably enterprising efforts to regain time lost by inevitable Sabbath-day single line-working and other engineering slacks, &c."

"On the down run with 330 tons load headed by the erstwhile Royal Atlantic No. 4442 and her regular driver, W. Sparshott of Pullman fame, I estimate that the numerous delays cost 25 minutes quite. Three and a half minutes were gained by smart station work at Peterboro' and Grantham and, as Doncaster was reached only 8 min. late, the remaining 13½ min. were recouped by the engine by dint of consistently good running whenever opportunity offered. The weather was damp with mist in patches.

"The corresponding up train which I learned had left York 26 min. late reached Doncaster only 21 min. after time; she left 19 min. late and despite a 'crawl' over a new bridge, was only 15½ min. late into Grantham. The engine up to this point was Pacific 2549 *Persimmon*, and she was replaced at Grantham by Atlantic 4401 and non-superheated 4-4-0 3043, each manned by Grantham crews. The load throughout was about 430 tons in all.

"The pair worked well together, attained almost 80 m.p.h. on the descent near Essendine and the arrival at Peterboro' was 14 min. late. Departing 12½ min. after schedule, good running was made but signals at danger approaching Finsbury Park prevented any further actual recovery on booked time. The net times would show a recovery of 10 min. by locomotives between Doncaster and London.

"On a recent occasion the up Hull express due King's Cross at 1.15 p.m. on weekdays was running late and covered the 76·4 miles start-to-stop from Peterboro' to King's Cross in 76 min., including delays costing 2 min., therefore the actual running average was 62 m.p.h. The load was only 200 tons, but not all drivers nor engines would make up so much time in any circumstances. The locomotive was 2543 *Melton* driven by Molsom of Doncaster, who has some remarkable Atlantic performances to his credit.

"Again, I have an authentic note of a run from Peterboro' to King's Cross by the 1.55 p.m. arrival when 4 min. were cut from the fast 82-min. schedule by driver Morley on *Flying Scotsman*, notwithstanding a slack. The load was over 400 tons and from Peterbro' to Hatfield the running time averaged just over 60 m.p.h., while throughout to King's Cross the average was 58·7 m.p.h. Another recent fine up *West Riding Pullman* achievement was the converting of an 8-min. late start from Leeds to an early arrival by 1 min. at King's Cross. This involved running into London from Grantham pass, 105½ miles in 104 min. The engine was 4436, 4-4-2; driver W. Barnes, London.

"These achievements were attained in the ordinary course of running during wintry weather and may not necessarily constitute records, but they are a fitting compliment to the disparaging criticisms which one hears in some quarters regarding British express running."

Locomotives of the Midland and South Western Junction Railway.

In view of various statements and corrections in regard thereto which have been given in "Locomotive Matters" as to locomotives formerly belonging to this railway, Mr. K. Strange, of Gloucester, sends a list of former M. & S.W.J.R. locomotives with their present G.W.R. numbers. 4-4-0 locomotives Nos. 1 to 9 inclusive, were renumbered in the G.W.R. list as Nos. 1119-1127, inclusive. The last of these, a somewhat smaller engine, has been scrapped. Nos. 10-12, 2-6-0, are now G.W.R. Nos. 1334-1336; Nos. 13 and 14, 0-6-0 tank engines, are Nos. 825 and 843; No. 15, 0-4-4T, is now No. 23; No. 16, 2-6-0, is No. 24; Nos. 17 and 18, 4-4-4T, are Nos. 25 and 27; 0-6-0s Nos. 19-28, are Nos. 1003-1011 and 1013, and 4-4-0 No. 31 is No. 1128.

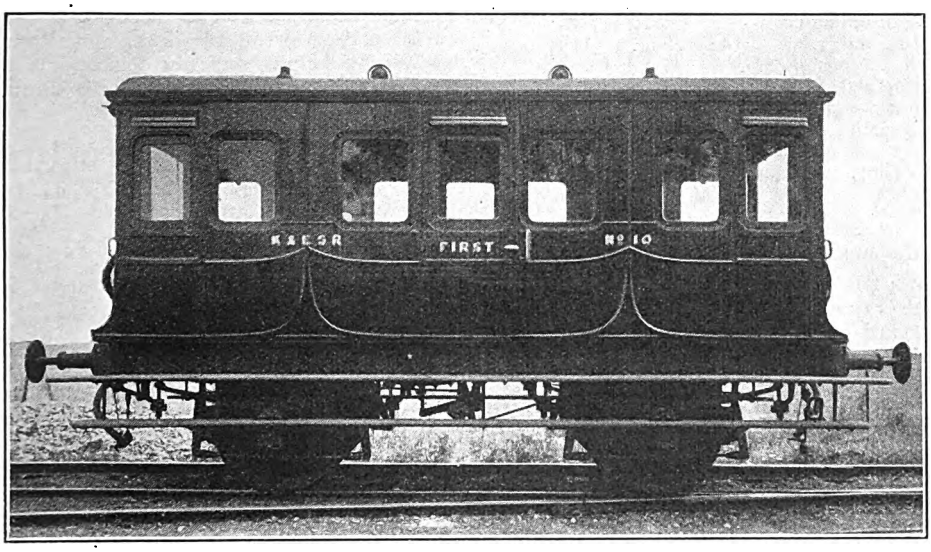
Kent and East Sussex Railway.

Mr. Harold F. G. Dalston sends two photographs (one of which is reproduced), for which he is indebted to Colonel H. F. Stephens, showing what is believed to be the oldest railway carriage still in service in the British Isles. It is used on the Kent and East Sussex Railway, and was built in 1848

Digitized by Google

as a saloon for the use of the late Queen Victoria, and was shown at the 1851 Exhibition. Originally, it formed part of a train of three such coaches, one of which is still to be seen on the Shropshire and Montgomery Light Railway. Mr. Dalston gives further particulars as follow :

" Later it became a Royal saloon on the late L. & S.W.R., and worked between London and Portsmouth, going also to Windsor. In 1890, however, it was sold to the Plymouth, Devonport and South West Junction Railway, and ran between Callington and Bere Alston. It was then transferred to its present owners—then, of course, the Rother Valley Railway. Fortunately, it is in an excellent state of preservation, due to the very careful handling it has received, and when not in use it is kept in a shed. There is a door in the centre of each side. The vehicle is divided into two compartments, each containing two sofas and a table. The upholstery is grey, with walnut panelling, while the exterior is painted thus : underframing, black ; coachwork, brown, with yellow lining and lettering ; roof, white. As will be seen, it is fitted with the continuous brake, and steam heating ; lighting is by gas. At present the coach is only used by the Manager and Engineer, Colonel H. F. Stephens."



OLD RAILWAY CARRIAGE BUILT IN 1848, K. & E.S.R.

A Reader's Comparison of Two Leading Locomotive Designs.

ARISING from a reply made in our " Why and Wherefore " section on the subject of the possible influence on the design of the L.M.S.R. *Royal Scot* locomotives by the performances of the G.W.R. *Castle* class engine over the L.M.S.R. main lines in the recent trials, Mr. W. A. Tuplin, B.Sc., sends some interesting notes. These include some detailed figures which he has prepared giving some of the principal dimensions of the L.M.S.R. *Royal Scot* and the S.R. *Lord Nelson* class engines. He remarks that a comparison of these two locomotives is very striking. The boilers of the two engines, so far as leading dimensions are concerned, are practically identical ; the distinctive firebox of the *Lord Nelson* in particular is very closely reproduced in No. 6100. A point of difference is in the number of cylinders employed, but even here it may be remarked that in each case a separate set of Walschaerts valve gear is used for each cylinder, whereas the more usual practice would be to use two sets only. Among minor details an exact correspondence will be seen in the shape of the cab ; type of firebox and of regulator handle ; the use of the soot blower ; and the horizontal position of the whistle ; all these features being new to the L.M.S.R. The trials of the G.W.R. *Launceston Castle* between Euston and Carlisle no doubt showed that a multi-cylinder simple 4-6-0 could handle the heaviest L.M.S. expresses without difficulty, and in this respect the *Royal Scot* can be regarded, our correspondent explains, as having been indirectly influenced by Swindon practice. The

Digitized by Google

following is the table of dimensions to which we have referred :—

	L.M.S. *Royal Scot.*	S.R. *Lord Nelson.*
Boiler—		
Diameter at firebox	5 ft. 9 in.	5 ft. 9 in.
Distance between tube-plates ..	14 ft. 6 in.	14 ft. 2 in.
Length of inside firebox	9 ft. $5\frac{5}{16}$ in.	9 ft. $8\frac{7}{8}$ in.
Width of inside firebox	3 ft. 3 in.	3 ft. $4\frac{1}{4}$ in.
Large tubes diam. ..	27 ft. $5\frac{1}{8}$ in.	27 ft. $5\frac{1}{4}$ in.
Small tubes diam. ..	180 ft. 2 in.	175 ft. 2 in.
Firebox heating surface	189 sq. ft.	194 sq. ft.
Grate area	31·2 sq. ft.	33 sq. ft.
Length of smokebox	6 ft. 0 in.	6 ft. 0 in.
Smallest diameter inside chimney ..	1 ft. 3 in.	1 ft. 3 in.
Length of outside connecting rod	11 ft. 3 in.	11 ft. 0 in.
Length of inside connecting rod	6 ft. 9 in.	6 ft. 11 in.
Adhesion weight ..	$62\frac{1}{2}$ tons	62 tons
Total weight	85 tons	$83\frac{1}{2}$ tons
Tractive effort at 85 per cent. working pressure	33,150 lb.	33,510 lb.

The Sevenoaks Accident.

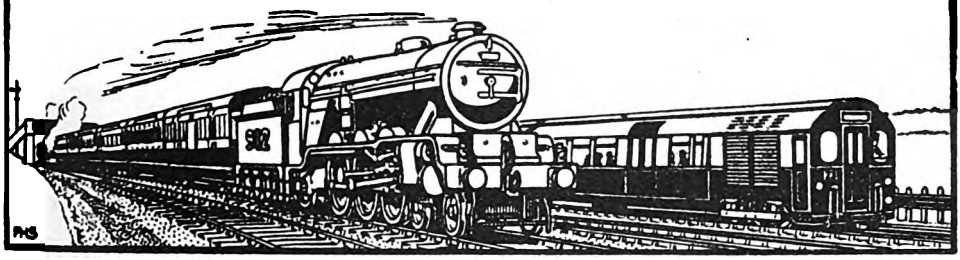
THERE is no need to deal with Sir John Pringle's report to the Ministry of Transport in regard to this accident in detail, as it has received so much attention in the general press within the last few weeks. There are, however, several aspects which call for brief attention here. Sir John Pringle definitely indicates that "the evidence taken at the inquiry is not sufficient in itself to prove decisively what was the cause of this derailment." The general trend of the evidence suggests, however, that there was a degree of weakness in the track at this point, that the type of engine used was liable to a degree of rolling on track which was not in the best of condition, that one of the leading coupled wheels was thus able to lift over the rail, and that catch points completed the derailment. It must, however, be remembered that, as emphasised by Southern Railway officials, the weather had been very bad, so that special attention had had to be given at many places on the system because of exceptional rains and consequent tendency to subsidence and irregularity of track, and that the very serious results of this accident were not due to excessive speed, or unsuitable engine or bad track maintenance, but to the fact that the derailment, which might otherwise have been quite an ordinary one, occurred at a point where a bridge with intermediate supports covered the line. It is, therefore, manifestly unfair to regard this accident, so far as causation factors are concerned, as a particularly serious one, or to support the view which has been advanced in some quarters, that track was not efficiently maintained, and that unsuitable engines were used, in that the very serious results arose entirely because of an unfortunate peculiarity of the location. There may have been a slackness in realising that the track at this point called for attention, and there may be some grounds for considering that had a different class of engine been used, nothing very serious would have happened. These points are not, however, decisively settled by the evidence or by Sir John Pringle's report, and the most that can be said is that the accident occurred at a very unfortunate place, and was attended by results entirely disproportionate to the seriousness of the accident as such.

The Locomotive Question.

THE evidence in regard to the engine and the tests carried out on the L.N.E.R. main line and on the Southern Railway between Walton and Weybridge, together with the evidence of Mr. H. N. Gresley and the derailment tests carried out by the Southern Railway, support the view that the "River" class engines are quite satisfactory at high speed on good track, though the suggestion is conveyed that on bad track they may roll rather more than tender engines under the same conditions. Attention has and is being given to the springing and compensating gear, and the chief difficulty appears to be as to why it should be one of the coupled wheels which was derailed, the leading Bissel track being, we gather, absolved from blame. This point arose also in the case of the derailment, between Bearsted and Hollingbourne, four days before the Sevenoaks' accident, and that at Wrotham some time before, the three-cylinder 2-6-4T No. 890 *River Frome* being concerned in both cases. There, also, one of the leading coupled wheels was derailed, but with the definite factor of track subsidence or weakness directly attributable to continued heavy rains. Consequently, speaking generally, the design has come through this investigation with a relatively clean character in that it has been shown that there are no inherent defects in the design, and the most that can be said is that they may roll rather more than other engines on track that is not quite in the best of condition.

Digitized by Google

WHAT THE RAILWAYS ARE DOING.



We are officially informed that Mr. M. F. Keogh, General Manager, Great Southern Railways, Ireland, having confirmed the intimation he gave some months ago that the state of his health would not permit his continuing as General Manager for more than a limited period to meet the convenience of the Board, his resignation was accepted with the deepest regret, to take effect as from May 1, 1928. Mr. T. Elliott, Commercial Manager, having completed 40 years' service, is also retiring, and from May 1 the duties of the Commercial Manager and the Operating Superintendent will be combined under a Traffic Manager, a position which will be filled by Mr. P. J. Floyd, at present Operating Superintendent. It is also pointed out that certain rumours affecting the organisation and officials of the Great Southern Railways, to which circulation has been given in the press, are altogether unauthorised and unfounded.

* * *

Mr. P. J. Floyd, who has been appointed Traffic Manager, Great Southern Railways of Ireland, entered the service of the Great Southern & Western Railway in May, 1891. After general experience of outside and station duties, he was transferred to the office of the Superintendent of the Line in January, 1898. In January, 1902, he was appointed Chief of the Trains Department—an important section of the office of the Superintendent of the Line. In May, 1906, he was appointed Superintendent in charge of the Northern District, and when the position of Superintendent of the Line became vacant in November, 1919, he returned to headquarters in that capacity. In November, 1924, he was appointed Operating Superintendent of the amalgamated lines in the Free State. As Traffic Manager, his appointment dates from May 1, 1928.

MR. P. J. FLOYD,

Appointed Traffic Manager, Great Southern Railways, Ireland, as from May 1, 1928.

* * *

We are advised by Mr. T. R. Smith, Secretary to the Cheshire Lines Committee, that Mr. James Mohan, Accountant, was retiring at the end of February, and would be succeeded by Mr. K. W. Doughty, hitherto Accountant to the Midland & Great Northern Railways Joint Committee.

* * *

Mr. K. W. Doughty, who has been appointed to succeed Mr. J. Mohan as Accountant to the Cheshire Lines Committee as from March 1 has for the last eight years held the position of Accountant to the Midland and Great Northern Railways Joint Committee. Mr. Doughty started his railway career in 1898, in the Chief Accountant's office of the Midland Railway, and spent five years as Accountant on the Severn & Wye Joint Line at Lydney, prior to taking up the position at King's Lynn he is now vacating.

* * *

Mr. J. A. Jenkinson, who has been appointed District Superintendent, Manchester, London & North Eastern Railway, as from January 31, 1928, commenced his railway career as a junior clerk in the Nottingham district in 1899. Six years

Digitized by Google

Digitized by Google

later he was transferred to the Chief Goods Manager's office, and in 1908 moved to the Stores Superintendent's office at Gorton. The following year he passed the G.C.R. higher-grade examination, as a result of which he received a course of training in all the principal departments. Upon the completion of this training, Mr. Jenkinson was attached to the train despatch office at Doncaster, and in January, 1914, transferred to the General Manager's office for special duties in connection with the Royal Commission on Railways. He became Assistant District Superintendent and Goods Manager, Marylebone, in March, 1914, and during the war served in France as an officer with the Railway Operating Division, Royal Engineers. He was appointed Assistant Traffic Manager at Grimsby Docks in December, 1919, and transferred to Manchester as Assistant District Superintendent in January, 1925.

* * *

MR. GEORGE SUTCLIFFE, who has been appointed stationmaster at King's Cross, in succession to the late Mr. Kemp, has for the past six years been stationmaster at Peterborough. A native of Louth, Lincolnshire, Mr. Sutcliffe entered Great Northern Railway service in 1900, at Deeping St. James. Later he transferred to Boston, where he became Chief Clerk to the District Superintendent.

* * *

MR. A. E. SEWELL, who has been appointed Assistant Goods Manager, Southern Area, L.N.E.R., in succession to Mr. H. Ferguson, has held the position of Rates Assistant to the Goods Manager, North Eastern Area, since August, 1923. Mr. Sewell was born at Whitby and was educated at Ackworth School and at Bootham School, York. He joined the North Eastern Railway towards the end of 1903, and, after gaining experience in various departments, was transferred to the General Manager's office in 1907. In 1912 he became a travelling Parcels Supervisor attached to the Passenger Manager's office, and later was appointed to take charge of the parcels section of that office. In 1915 Mr. Sewell was transferred to the Chief Goods Manager's office, where he controlled the wagon demurrage section. In 1919 he was promoted to the Rates office at York, of which he ultimately took charge. From July, 1921, to April, 1922, he was released to act as Secretary to the Committee of Goods and Mineral Managers of the "Eastern Group Companies," which was appointed to co-ordinate the arrangements of the seven component companies in anticipation of amalgamation.

L.N.E.R. APPOINTMENTS.

IT was announced in October last by the London & North Eastern Railway that Mr. J. Procter Smith, Divisional Accountant, Southern Area, who was retiring from the service on February 29, would be succeeded by Mr. H. Laird, Divisional Accountant, North Eastern Area, who would in turn be succeeded by Mr. R. Brown, General Assistant to the Chief Accountant.

We are now officially informed by the London & North Eastern Railway that Mr. Laird has asked to be allowed to remain in his present post at Newcastle-on-Tyne, and that the Directors have, therefore, made the following appointments :—

Mr. G. Sutherland, Assistant to the Chief Accountant, to succeed Mr. Procter Smith as Divisional Accountant, Southern Area.

Mr. R. Brown, General Assistant to the Chief Accountant, to succeed Mr. Sutherland as Assistant to the Chief Accountant.

We are also informed that the Directors of the London & North Eastern Railway have made the following appointments :—

Mr. A. E. Sewell, Rates Assistant to the Goods Manager, North Eastern Area, to be Assistant Goods Manager, Southern Area, in succession to Mr. H. Ferguson, who retired at the end of February.

Mr. W. Lyle, Indoor Assistant to the Superintendent of the Southern Scottish Area, to be District Operating Superintendent at Burntisland for the Northern Division of the Southern Scottish Area, in succession to the late Mr. D. McRobbie.

Mr. W. Y. Sandeman, Chief Assistant, Engineer's Office, Edinburgh, to be District Engineer at Thornton for the Northern Division of the Southern Scottish Area, in succession to Mr. D. L. Anderson, who retired on January 31.

* * *

GREAT WESTERN RAILWAY APPOINTMENTS.

THE following appointments have been authorised :—

Docks Department.

Mr. H. B. Smith, Dock Manager, Plymouth, to be Dock Manager, Port Talbot, vice Mr. R. J. Williams, deceased.

Mr. E. C. Edwards, Dock Manager, Penarth, to be Dock Manager, Plymouth.

The supervision of Penarth Dock has been transferred to the Dock Manager at Cardiff, Mr. W. N. Thompson, to whom communications relating to matters previously dealt with by the Dock Manager at Penarth should be addressed.

Mr. E. W. Gould, Representative, Chief Docks Manager's Office, Cardiff, to be Agent, Docks and Passenger Traffic Office,

Digitized by Google

84, Leadenhall Street, London, as from February 27.

Road Transport Department.

Mr. B. Tee, Chief Clerk, Road Transport Department, to be Commercial Assistant and Chief Clerk.

* * *

WE regret to announce the death of Mr. Alfred Booth Garside, late Assistant General Manager of the Metropolitan Railway, which occurred on January 8, after a short illness, at the age of 82. Mr. Garside, who retired on October 31, 1913, was widely known in railway circles. He entered Metropolitan Railway service in the Estate Department in the early 'seventies, and was transferred to the General Manager's office, where he was installed as Chief Clerk, on December 1, 1881. He was appointed Assistant General Manager in November, 1901.

* * *

THE following appointments on the Buenos Ayres Western Railway are officially announced, consequent on the retirement of Mr. A. W. Bannatyne, Chief Mechanical Engineer, and Señor Tomas N. Gonzalez, Traffic Manager; Mr. J. W. H. Rea to be Chief Mechanical Engineer; Mr. John Wilson to be Chief Electrical Engineer; Mr. C. A. Roberts to be Traffic and Transport Manager.

* * *

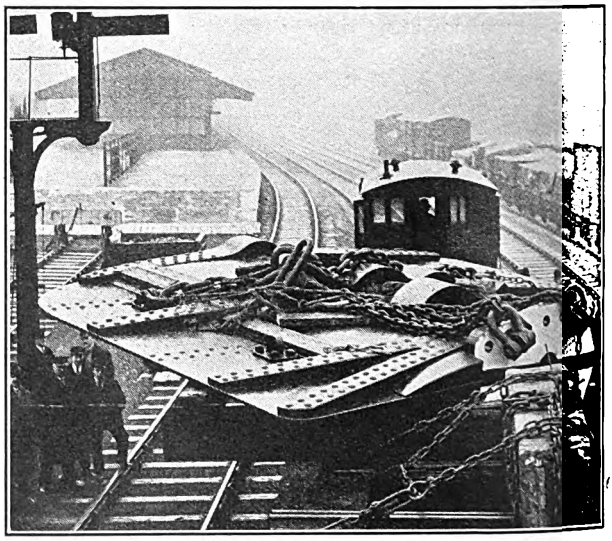
MR. M. F. KEOGH, General Manager, Great Southern Railways (Ireland), has accepted the Chairmanship of the Board of Management of the Institution for 1928. The 70th anniversary dinner will be held in the Hamilton Hall, Liverpool Street Station Hotel, on Wednesday, May 2. Lieut.-Col. The Right Hon. Wilfrid Ashley, M.P., Minister of Transport, and President for 1928, will preside.

* * *

THE London Midland & Scottish Railway Company announce that the first twenty-four of their engines of "The Royal Scot" class, the type that hauls the world's record non-stop train, are to be named after famous regiments. The names selected are: *Royal Scot, Royal Scots Grey, Black Watch, Royal Scots Fusilier, Scottish Borderer, Cameron Highlander, Gordon Highlander, Argyll and Sutherland Highlander, Seaforth Highlander, Royal Engineer, Grenadier Guardsman, Royal Fusilier, Sherwood Forester, Dragoon Guardsman, Coldstreamer, Scots Guardsman, Irish Guardsman, Welsh Guardsman, Royal Welch Fusilier, Lancashire Fusilier, Royal Inniskilling Fusilier, H.L.I., Royal Ulster Rifleman, Royal Irish Fusilier.*

* * *

AT the annual general meeting of the Transport Observation and Models Society, held at St. Bride's Institute, London, E.C.4, the following members were elected to act as the committee for 1928:—Mr. R. J. Westby (Chairman), Mr. N. H. Bayley (Deputy-Chairman), and Messrs. C. Baker, H. A. Dear, S. M. W. Hann (Secretary and Treasurer), C. B. Maycock, R. W. Poyser, and S. C. Reynolds. Prospective members should apply to the Secretary at Frensham, Shirley Road, Croydon.



LOWER PART OF NEW RUDDER FOR "AQUITANIA"—OUT OF GAUGE LOAD WEIGHING 54 TONS—ON RAIL AT EAGLESCLIFFE, L.N.E.R. [*Topical.*

* * *

THE main lower part of a new rudder for the Cunard liner *Aquitania*, completed by The Darlington Forge Limited, was recently despatched by special train to Haverton Hill for conveyance by water to Southampton. The dimensions of the rudder were such that conveyance by rail to Southampton was impossible, and to convey it to the Tees-side port necessitated special arrangements. These were admirably carried out and the rudder, leaving Darlington at 9 a.m., arrived,

Digitized by Google

without incident, at Haverton Hill about 10 o'clock. A photograph showing the load at Eaglescliffe is reproduced.

* * *

THE L.N.E.R. Directors recently authorised the construction of 340 passenger carriages, restaurant cars and guards' vans for the services of the L.N.E.R. These include two sets of triplet all-electric articulated restaurant cars similar to those in service on the "Flying Scotsman" expresses, 28 sets of articulated carriages, and 226 other vehicles, including first-class and third-class corridor and non-corridor carriages. More bogie articulated trains are being built for the "inner" suburban services from Liverpool Street and King's Cross. A new type of bogie articulated stock giving improved passenger accommodation is also being provided for the "outer" suburban services between London and such places as Welwyn, Hertford and Hitchin. Six complete new train sets with restaurant cars will be provided on the Great Central section, and new restaurant cars on the Great Eastern section.

* * *

A PAPER on "Railway Companies as Common Carriers" was delivered by Mr. Valentine Ball at a recent meeting of the Railway Students' Association, London School of Economics. The lecturer explained that the main provisions of the Carriers Act, 1830, were still in force, though it had been amended so as to apply, as from the Appointed Day, to carriers partly by land and partly by sea, while, so far as railway companies were concerned, the figure of £10 which appeared in the Act as the value below which article need not be declared, was now raised to £25. He also referred to the great extension of a railway company's liability for passengers' luggage caused by decision in the recent case of Vosper *v.* G.W.R. The new standard terms and conditions of carriage were also discussed.

* * *

COLONEL A. C. TRENCH'S report to the Ministry of Transport on the collision which occurred in the early morning of November 22, at St. Mary's Junction, Derby, has been issued. The goods train was drawn by 0-6-0 No. 4420, and the passenger train by 4-4-0 No. 1021. In passing into the sidings, ten wagons and the van of the goods train became uncoupled, and, while standing on the main line were run into by the following passenger train. The accident is attributed to the accidental uncoupling of the rear wagons of the goods train, with the suggestion that had the coupling in question been made by means of the hook fitted with a nib on one of them, instead of by means of the ordinary link with which the other wagon concerned was fitted, uncoupling would not have occurred. This accident, therefore, emphasises the importance of the general adoption of the new standard nibbed hook. The suggestion is made that the fitting of a mirror to the signalbox at the point would have given the signalman a better opportunity of observing the absence of the tail lamp from the goods train as it passed into the siding. The view, in this respect, was very much restricted, and the signalman is not blamed. Apart from certain incidental comments no particular blame is attributed to any of those concerned.

* * *

THERE was a large gathering of members of the Manchester and Liverpool Section of the Permanent Way Institution at the School of Signalling, Victoria Station, Manchester, on Saturday afternoon, January 21, when Mr. C. Travis, M.Inst.T., Associate Editor, *The Railway Gazette*, delivered a lecture on "The Railways of South America, with Special Reference to Permanent Way and Works." Mr. H. Guest occupied the chair.

* * *

A MEETING was held at 18, George Street, Edinburgh, on Tuesday, February 14, to inaugurate a Scottish Section of the Institute of Transport. The President (Mr. Roger T. Smith), accompanied by the Secretary, attended the meeting. Further particulars can be obtained from the Acting Secretary of the Section, Mr. R. Stuart Pilcher, M.Inst.T., Manager of the Edinburgh Corporation Tramways and Motors, 2, St. James's Square, Edinburgh.

* * *

BEYER, PEACOCK & CO. LTD., have received an order for three Garratt patent articulated locomotives of great power and of unique design from the New Zealand Government Railways. These engines will have a tractive effort of over 51,000 lb. at 75 per cent. boiler pressure, thus having a greater tractive effort than any Garratt locomotive working on the 3-ft. 6-in. gauge, including the South African Railways. The engines will have the 4-6-2 + 2-6-4 wheel arrangement, and will be three-cylindered, *i.e.*, having six cylinders, Gresley gear working the inside valve. The boiler pressure will be 200 lb., and the grate area 58 sq. ft., which will be fired by a mechanical stoker, the first to be applied to any articulated locomotive in Great Britain. The

Digitized by Google

Digitized by Google

stopping places on the Marylebone-Manchester route and at Liverpool Street, Stratford, and Parkeston Quay. The L.N.E.R. was the first to introduce electric cooking on trains when, in 1924, articulated restaurant-car sets (whereby three vehicles are carried on four bogies) were added to the "Flying Scotsman" expresses; the weight of these electric restaurant-car sets is 83 tons, and they enable 78 passengers to be served simultaneously.

* * *

WRITING in reference to the G.W.R. Bristol–Birmingham trains which run over the L.M.S.R. between Yate and Standish Junction, Mr. C. J. G. Boyte explains that G.W.R. 4-6-0 locomotives of the "2900" class are now allowed over this route, subject to a 30-m.p.h. speed restriction over Stonehouse Viaduct. Presumably, this is to allow more powerful locomotives to be used to meet the needs of heavy summer traffic. It is suggested that, in due course, L.M.S. 4-6-0 locomotives will also be able to run over the Birmingham–Bristol main line.

* * *

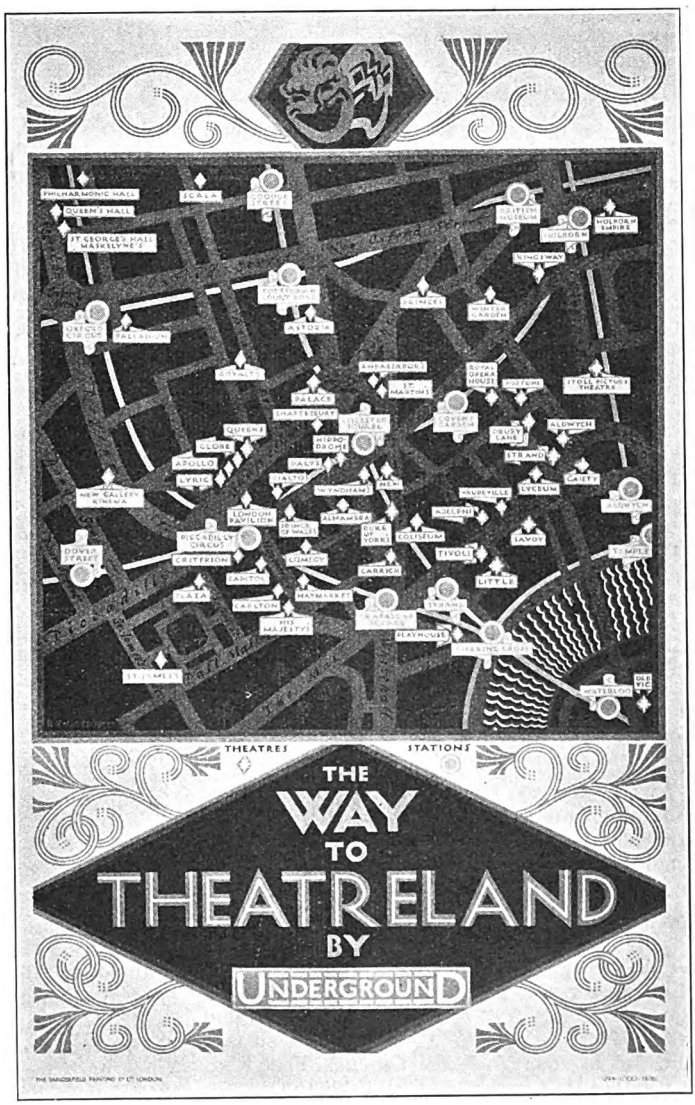
THE Great Western Railway announces a special rate for the transport of cars through the Severn Tunnel. On payment of 7s. 6d. motorists can have their cars conveyed through the tunnel from or to the nearest station on either side, and save a detour of 50 miles *via* Gloucester.

* * *

THE Metropolitan Carriage, Wagon & Finance Company, of Birmingham, has been awarded a contract for 50 main-line coaches for the South African Railways, to cost £170,000. It is understood that the tender was successful on its merits only. There was keen competition from Continental firms, including Belgian and German manufacturers, but the British tender, while not the lowest, was considered to be technically the most favourable.

* * *

"THE estate administered by the Estate Department of the L.M.S. Railway, has an approximate rent roll of £1,300,000 per annum, with 94,000 tenants," said Mr. W. H. Christy Clay, of the L.M.S. Railway, at the Surveyors' Institution recently. A staff of three hundred is engaged on the work of this huge estate.



AN INTERESTING THEATRICAL POSTER ISSUED BY THE "UNDERGROUND."

* * *

GOOD progress is being made with the

Digitized by Google

extension of the Romney, Hythe and Dymchurch Light Railway from New Romney to Dungeness, and it is hoped that this extension will be opened on June 1 next.

* * *

ON January 5, the Governor of Bombay, Sir Leslie Wilson, inaugurated the electrification of the suburban service of the Bombay, Baroda & Central India Railway. The scheme has cost about £1,500,000.

* * *

THE 9.45 a.m. from Manchester (London Road) and the 4 p.m. from Euston to Manchester are to be named "The Mancunian," while the 12.5 p.m. from Manchester (London Road) and the 6.5 p.m. from Euston to Manchester will be named "The Lancastrian."

* * *

AMONGST the new concessions announced by the railway companies to come into effect this month is one of interest to motorists requiring to take their cars by passenger train. Hitherto the rate for conveyance under these conditions has been 4½d. per mile, but in future the rate for cars accompanied by not less than two adult persons undertaking the return journey will be 3d. per mile at owners' risk.

* * *

THE L.N.E.R. is to instal shortly on suburban trains from King's Cross and Liverpool Street destination indicators of the roller blind type, similar to those in use on certain of the London tramways.

* * *

IN order to meet the requirements of manufacturers and traders for the transport of their goods in bulk without intermediate handling, the L.N.E.R. is constructing 450 containers with capacities varying from 2½ to 4 tons.

* * *

WIMBLEDON and District Model Railway Club fixtures include :—March 19, 7.45 p.m., lantern lecture. "A Railway Tour Round the World," by Mr. C. Travis. Associate Editor of *The Railway Gazette*, The Red-Cross Hall, Church Road, Wimbledon.

* * *

WOOTTON PILLINGE station, L.M.S.R., has been re-named Wootton Pillinge for Stewartby.

* * *

THE Railway Correspondence and Travel Society (incorporating the Cheltenham Railway Club), is the latest recruit to the ranks of railway clubs. The secretary of the Society is located at 5, Pittville Terrace, Cheltenham Spa. The London secretary is Mr. D. S. Barrie, 42, Belsize Park, Hampstead, N.W.3.

* * *

AN amalgamation has been arranged between Thomas Cook & Sons, Thomas Cook & Son Ltd., and its associated companies, and the Compagnie Internationale des Wagon-Lits and des Grands Express Européens. Lord Dalziel of Wooler, representing the Wagons-Lits Company, will join the boards of Thomas Cook & Son Ltd. and Thomas Cook & Son (bankers) Ltd., as vice-chairman, and Mr. Frank Henry Cook will continue to be chairman of both the Cook Companies. Other representatives of the Wagons-Lits Company will also join the boards of both the Cook Companies. The Cook businesses will be carried on as heretofore under their existing corporate bodies.

* * *

AT a meeting of the Great Western Railway (London) Lecture and Debating Society, held on February 2, in the General Meeting Room at Paddington Station, Mr. Frank Pick, Assistant Managing Director, London Underground Railways, gave an interesting address, entitled "A Survey of Railways." Mr. F. R. E. Davis, Secretary, Great Western Railway, was in the chair. The address was followed by an instructive discussion.

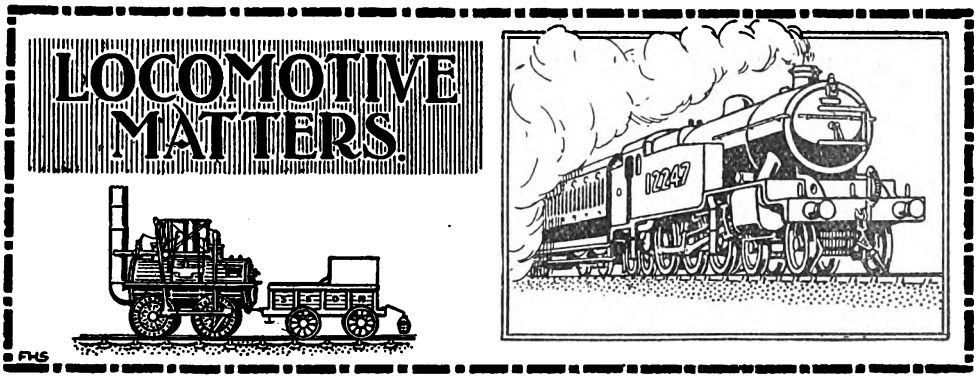
* * *

THREE-THOUSAND-FIVE-HUNDRED trains were required to take the 1,400,000 half-day excursionists who travelled on the L.M.S. Railway during 1927. These figures are an enormous advance—nearly three times as much—over the previous year's figures.

* * *

WORK is well advanced on the new signal equipment at London Bridge, Southern Railway, and it is anticipated that the installation will be ready for service in June next. The new signal cabin, the largest and most up to date of its kind in the world, will be equipped for dealing with about 2,000 trains daily. The building is 113 ft. long and 16 ft. wide, the signal frame of 311 levers being 70 ft. long and weighing 23 tons. The new cabin will enable five existing cabins to be displaced and 615 mechanical levers dismantled. It will control 7½ miles of track, including 10 or 11 running lines between London Bridge and Bricklayers' Arms Junction, 11 tracks in the Central Section station, and 11 tracks in the Eastern Section station (High and Low Level). A large route diagram is being provided.

Digitized by Google



Under this heading will be inserted short references to news items relating to locomotive engines and their duties. It must be understood, however, that information as to the stations of particular engines cannot be given, for the reason that, before the date of publication, transfers may have taken place, while lists of engines, &c., debarred from "The Why and the Wherefore" section, cannot be included under this heading. With this understanding, notes as to matters thought to be of general interest will be welcomed.

L.M.S.R.

Named locomotives at Warwick include 4-6-0's No. 5537, 5554 *Prospero*, and 5522 *Lightning*, and "Precursors," Nos. 5264 *Pacific*, 1516 *Alecto* and 303 (superheated) *Himalaya*. 0-6-2T No. 6868 is also at Warwick.—[F. V. W.]

4-6-4T Nos. 11116 and 11119 are apparently the only engines of the class still on L. & Y. routes. One or two others work Manchester – Buxton trains. Passenger locomotives at Manchester (16) are: "Precedents," 5057 *Courier*, 5058 *Alan*; "Precursors," 5187 *Helvellyn*, 5188 *Marquis*, 5189 *Albatross*, 5190 *Ajax*, 5191 *Archimedes*, 5192 *Cossack*; "George V," 5347 *Elkhound*, 5348 *Coronation*, 5349 *British Empire*, 5350 *India*, 5351 *Canada*, 5352 *Australia*, 5353 *Staghound*, 5354 *New Zealand*, 5355 *South Africa*; "Prince of Wales," 5700-1-2-3, 5704 *Scotia*, 5705, 5706 *Canning*, 5707 *Hampden*; "Claughton," 6010, 6011 *Illustrious*, 6012, 6013, 6014, 6015, 6016, 6017 *Breadalbane*, 6018, 6019 *Llewellyn*, 6020.—[E. Dalton Leggett.]

"Claughton" 4-6-0's at Holyhead, for working mail trains, include Nos. 5972, 5983 and 5992–5995.—["Irishman."]

New 2-6-4T Nos. 2300–2302, 4-6-4T Nos. 11115–11118 and 0-6-4T Nos. 2000 and 2001 are now working on the Midland section in the London district. No. 2300 has a number about half the usual size, viz., on the cab side, with L.M.S. on the tanks, as also "Precursor" tank engine No. 6785.—[E. J. Norris, H. S. Hack, D. S. T. Simpson, L. H. Adams, A. E. Clarke and others.]

The "Mid-day Scot" was recently worked through from Glasgow to Crewe by No. 6113 and on another day by No. 6132.—[J. A. Eccleston.]

Midland 4-4-0 No. 543 recently worked the 3.22 p.m. Leicester - Birmingham - Norwich Cromer train in place of the usual M. & G.N. locomotive. New compound 4-4-0's Nos. 928-930 are at Leicester, also 0-6-0's Nos. 4424-8. 2-6-0's Nos. 13091-2 are at Leicester and Nos. 13053 at Leeds.—[R. Webster.]

"Royal Scot" 4-6-0's are stationed: Nos. 6100-9 at Camden; Nos. 6110-6113 at Rugby; Nos. 6114-6134 at Crewe North. Nos. 6135-6139 at Carlisle and 6140-6149 at Edge Hill, Liverpool.—[A. Staniford, F. V. W., A. W. Parsons and others.

Interesting workings for new 4-6-0 engines stationed at Carlisle are: 10.30 p.m. Edinburgh and Glasgow, worked from Carlisle to Euston, returning the following night after rest on the 11.5 p.m. from Euston to Carlisle; Mondays, Wednesdays and Fridays 10 a.m. ex Glasgow and Edinburgh, worked from Carlisle to Euston, returning next day on 10 a.m. from Euston to Carlisle. (The corresponding trains on alternate days are worked by London engines.) Sundays, 10 a.m. ex Glasgow, Carlisle to Crewe, returning on Mondays on the 12.30 a.m. ex Euston (3.40 a.m. ex Crewe).—[A. W. Parsons.]

Midland 0-4-4T No. 1250 was seen at Burton fitted for working the L.N.W. section motor-train for Tutbury. L. & Y. 0-6-0 No. 12117 is working goods trains on the Chesterfield area.—[J. H. Woolley.]

It is hardly likely that No. 17922 has been scrapped as stated last month. This is a 4-6-0 goods engine belonging to the Highland section, built in 1919. Presumably Caledonian 0-8-0 No. 17992 was meant.—[F. V. W. New 2-6-4T locomotives No. 2303 is at Manningham and has been working Bradford-Leeds fast trains. These trains often load

Digitized by Google

up substantially and constitute a hard task for 0-4-4T engines. Some are, however, worked by Carlisle and Leeds compound or "999" class engines. 2-4-0 engines rebuilt with Belpaire fireboxes working in the Leeds and Bradford district include Nos. 156, 169, 208, 209, 212, 214-6-7-9, 221, 242, 248, 250 and 253. 0-4-4T engines include Nos. 1286-7-8, 1290-7-8, 1356-8, 1360, 1412-3-6 and 1430. Old well-tank 0-4-4T engines Nos. 1200-1-2 have left Manningham. 4-4-0 No. 992 is not yet renumbered in the 801-9 series. Carlisle engines on the Midland route include compounds Nos. 932, 934, 1073-4-5 and "999" class 4-4-0's Nos. 801, 992, 803-809, together with several "rebuilt" 4-4-0's. Goods engines at Carlisle include 3999-4016 and 4226-7. G.S.W. engines from Kingmoor (Carlisle) also work over the Midland routes south. Thus, 2-6-0's No. 17821 has been noted at Hellifield, and No. 17827 at Frizinghall 0-6-0T Nos. 7115-6 are at Leeds and Nos. 16502-3-4 at Manningham. Keighley has No. 16550. Nos. 1952-3-4 work Worth Valley trains. Unrebuilt 4-4-0's Nos. 310-1-4 are at Hellifield. There are also several old double-framed 0-6-0's. No. 3346, still carrying a "B" class boiler, is at Hellifield and was used as snow plough engine. "Rebuilt" 4-4-0's include Nos. 334 and 365 at Manningham, Nos. 464, 470-1-2 and 460-5 at Hellifield, and Nos. 448 and 452-3-4-5-6 at Lancaster. On New Year's Day an excursion of 12 centre-corridor coaches and kitchen was worked from Bradford by No. 365, assisted by No. 740 from Shipley to Carlisle. No. 6127 ("Royal Scot" class) worked the train north of Carlisle. The Ljungström turbine locomotive has several times worked the Continental train due in Leeds at 1.45 p.m., returning to Derby with the "Thames-Clyde" express at 2.35 p.m. "Royal Scot" 4-6-0 No. 6145 was on exhibition at Leeds, January 16-18 and Bradford January 19-21.—[A. P. HERBERT.]

Presumably 8681 is the new number which No. 2359 (formerly N.S.R. No. 84) will bear when transferred to the Western Division list. "Claughton" class No. 6024 is painted red, but has the letters L.M.S. on the tender and the number on the cab sides.—[A. H. HORROCKS.]

0-6-0T No. 16476 was recently noted at Acton (G.W.R.) from the North and South Western Junction line. It had a L.N.E.R. brake van, and was presumably worked through from the L.N.E.R. Possibly a reader can explain this. The Cricklewood-Acton Wells Junction line is usually worked by older 0-6-0 locomotives, though new 0-6-0 No. 4280 has been seen on this section.—["ACTON WELLS JUNCTION."]

Engines seen at Hereford include 0-8-4T No. 7931, 2-4-2T No. 6721, 0-4-0T No. 11214, *L.N.W. Engineer* and *Engineer, South Wales*.—["TINTAGEL CASTLE."]

0-6-0T Nos. 16446–9 are stationed at Aston, Birmingham, and work local goods as well as performing shunting duties.—[E. J. DAVEY.]

Engines noted working Nuneaton-Leicester trains include 1901 *Jubilee* and 5126 *Dominion*. L. & Y. 0-6-0 No. 12120 was noted at Leicester. All 6100 class 4-6-0's have L.N.W. shed plates fixed in Midland position on smokebox door.—[R. WEBSTER.]

A number of the "Royal Scot" class 4-6-0 locomotives have been re-allocated, *i.e.*, transferred from one shed to another, presumably, in order to secure numerical sequence. As now arranged, Camden have Nos. 6100-9; Rugby Nos. 6110-3; Crewe Nos. 6114-26 and 6133-4; Carlisle Nos. 6135-9; and Edge Hill Nos. 6140-9. The remaining six engines, Nos. 6127-32, are attached to the Northern division and stationed at Polmadie (Glasgow). These, in turn, have all worked up to Crewe on either the mid-day or night Scot trains. It is understood that names will shortly be added to Nos. 6101-49, the first twenty-three after famous regiments. Another will be named "Condor." "Claughton" class 4-6-0's Nos. 5947-9 have been transferred from Crewe to Llandudno Junction. The former of these is finished in red livery (including the tender). Nos. 4447-8 are the latest 0-6-0's to be turned out at Crewe, both of which are painted black with the number in fairly large figures on the cab panel and the letters L M S on tender, in accordance with the new standard practice. One of the earlier-built 2-6-0's, No. 13036, has also appeared from the paint shop similarly numbered and lettered, but in this case painted red instead of black. The three engines thus noted all left the paint shop on January 25.

Only 13 of the original class of 90 6-ft. 2-4-0 "Jumbos" now remain in service. Of these, five still retain their old L.N.W. numbers, viz., 124 *Marquis Douro*, 634 *Ellesmere*, 642 *Bee*, 814 *Henrietta*, and 934 *North Star*. The others bear new numbers, as follows:—5085 *Hero*, 5087 *Narcissus*, 5088 *Charon*, 5092 *Violet*, 5095 *Tartarus*, 5097 *Adelaide*, 5102 *Cuckoo*, and 5104 *Woodlark*. The Vulcan Foundry Limited have recently commenced delivery of fifty 0-6-0 freight tank engines, all of which are for service on the L.N.W. section, with the exception of the first five; these, it is understood, are for service on the Midland division. They are numbered from 16550 onwards and delivered up to No. 16571. These were all broken n

Digitized by Google

at Warrington and afterwards despatched light to their respective stations. Those for the Midland division travelled *via* Crewe and Stoke. Several of the new 0-6-0's ex N.B. Loco. Co. (series 4487-4506) are at work on the N.S. section, including Nos. 4501, 4503 and 4506. Recent withdrawals include two further 6-ft. 6-in. 2-4-0 "Jumbos," viz., Nos. 381 *Patterdale* and 2186 *Lowther*.—[C. WILLIAMS.]

"Claughton" engines Nos. 5946-5949 are at Llandudno Junction and work the Club train to Manchester. N.S. 2-4-0's Nos. 1447 and 1448 are also at Llandudno Junction.—[A. H. B.]

L.N.E.R.

N.E. 0-6-0T Nos. 197 and 198 have come to Darlington to be scrapped. Tennant 2-4-0's Nos. 1472–5–8 are at Darlington for repairs. Three-cylinder 4-4-2's Nos. 728 and 2206 are fitted with A.C.F.I. feed-water heaters and pumps. New 4-4-0's Nos. 264 *Stirlingshire*, 265 *Lanarkshire*, and 266 *Forfarshire* are now at work in Scotland. Nos. 270 and 277 *Berwickshire* are also in service.—[J. W. ARMSTRONG and E. MAXWELL.]

A Sentinel steam locomotive No. 9529 is now in use at Dundee for dock shunting in place of 0-4-0T No. 10084.—[E. MAXWELL.]

Two goods trains attached were noted on the Edgware branch, the two engines, both at the head, being old 0-6-0 No. 3199 and large 0-6-0 No. 3572.—["ACTON WELLS JUNCTION."]

New 4-4-0's Nos. 251 *Derbyshire* and 253 *Oxfordshire* have been working from Leeds on Liverpool-Leeds-Sunderland-Newcastle trains. 4-6-2 No. 2573 *Harvester* is one of a number running with modified valve gear. Interesting instances of double-heading noted at Newcastle included G.N. 4-4-0 and N.E. 4-4-2; N.E. 4-4-2 and N.B. 4-4-2; and N.E. "Q" and "R" class 4-4-0's. N.E. three-cylinder 4-4-2 No. 2163 is fitted with a Dabeg feed-water heater and pump. L.N.E.R. locomotives and rolling-stock exhibited at Newcastle on January 22 included an old colliery locomotive, 0-6-0T crane engine by Hawthorn; 0-4-0 battery electric locomotive *Wembley*; 4-6-2 No. 2572 *St. Gatien*; 0-4-4T of class B.T.P.; 4-4-0 No. 253 *Oxfordshire*; Sentinel-Cammell steam rail coach; first-class restaurant car; sleeping car; first-class Pullman car *Sybil*; Gateshead breakdown crane. The Sentinel-Cammell car was finished in a silver or aluminium shade instead of the usual L.N.E.R. livery. At a similar exhibition at Blyth the restaurant car, sleeping car, B.T.P. tank engine and 4-6-2 No. 2568 *Sceptre* were shown.—[SELBY WILKINSON.]

G.N. 2-6-0's working on the G.E. Section include Nos. 4647, 4652–3, 4655–6, 4662–3–4 and 4675.—[G. WHITEHOUSE and F. LEMON.]

G.N. 0-6-2T Nos. 4721–3–5–7–9 and 4731 are in Glasgow.—["EVANDHU."]

G.W.R.

4-4-0's withdrawn from service included Nos. 3718 *City of Winchester*, 4105 *Earl Cawdor*, 4114 *Shelburne*, 4116 *Savernake*, 4117 *Shakespeare*, 4118 *Waterford*, 4119 *Wynns Fay*, 4125 *Khartoum*, 4126 *Kimberley*, 4128 *Marne*, 4133 *Roberts*, 4134 *Sir Redvers*, 4135 *Pretoria*, 4136 *Terrible*, 4144 *Columbo*, 4146 *Sydney*, 4147 *St. Johns*, 4151 *Calceolaria*, 4153 *Camellia*, 4155 *Cineraria*, 4160 *Carnation*, 4165 *Narcissus*, 4166 *Polyanthus*. "Duke" class No. 3257 *King Arthur* has had its name plates removed and is nameless.
[R. WEBSTER, J. D. HALL, H. P. H, "G.W.R. ENTHUSIAST," "TINTAGEL COURT," J. H. ASTON, E. G. ANDREWS and R. G. DANIELLS.]

4-6-0 No. 4000 *North Star* was recently noted as an express excursion between Birkenhead and Paddington. Expresses between Birkenhead and Paddington, are usually hauled as far as Chester by G.W.R. 0-6-0's, 2-4-0's, 2-6-0's and 2-6-2T's. They are then taken over by "Saints" and occasionally by "Stars" and "Castles." Express half-day excursions are taken, however, by the larger locomotives, direct from Birkenhead, avoiding Chester by a loop line.—[R. B. LOCKEY.]

New 2-6-0 engines numbered 83XX include modifications as compared with earlier locomotives. They are slightly heavier than the older ones and are classed separately as they are subject to certain restrictions as to sections over which they can run.—R. G. DANIELLS and C.S.C.]

New "King" class 4-6-0's under construction are :—6007 *King William III*, 6008 *King James II*, 6009 *King Charles II*, 6010 *King Charles I*, 6011 *King James I* and 6012 *King Edward VI*. 0-6-2T engines have been placed in service up to No. 6626.—[J. H. ASTON.]

The 1.30 p.m. ex Paddington and the 11 a.m. ex Penzance are usually worked by "King" class locomotives.—[S. P. W. CORBETT.]

4-4-0 No. 3254 is named "*Cornubia*," not "*Colombia*," as stated.—[E. G. ANDREWS.]

Digitized by Google

S.R.

On January 1, 1928, it was still possible to see, in the Isle of Wight, two locomotives built in 1864. These were W13 *Ryde* and W14 *Shanklin*. The former was in service on the Bembridge-Brading branch, taking duty on alternate days with the more recent engine, W16 *Wroxall*, built in 1872. The old *Shanklin* is not so "healthy," as it is now out of service, though it was used as recently as October, 1927, while W13 was in the shops.—[C. G. WOODNUTT.]

B Section 0-4-2's Nos. B181 and B197 have been noted on the Redhill-Tonbridge line.—[V. W. POTTER.]

0-4-4T No. A358 with domeless boiler was recently noted at Kingston-on-Sea supplying steam to a stationary engine. Presumably, this replaces 0-6-0T No. B135 on this duty.—[H. J. SOUTHWARK.]

4-8-0T No. 494, generally used for hump shunting at Feltham was noted recently at Old Oak sidings, Willesden, on a Southern Railway goods train. Southern Railway locomotives generally working over the Cricklewood-Acton Wells Junction line include 0-6-0's Nos. E308, E385, E687, E693, E317, E339 and occasionally E0496.—["ACTON WELLS JUNCTION."]

The following is an analysis of the numbers of A section 4-4-0's now in service, according to classes :—F, 7 ; F1, 70 ; B, 2 ; B1, 27 ; D and D1, 51 ; E and E1, 26 ; L, 22 ; L1, 15 ; M3, 2 ; total, 222. Class B (440) engines have larger boilers than Class F (240), but the rebuilt versions (B1 and F1) are very similar, though they may be readily distinguished. The B1's have large capacity tenders with springs below the platform, while the tenders of the F1's are the common Stirling type with springs above. Class B consisted of Nos. 13, 17, 21, 34, 101, 132, 186, 189, 217, and 440-459, of which 34 and 458 remain in their original domeless form. The seven domeless "240" class engines are Nos. 22, 139, 172, 210, 211, 222 and 241. The two remaining Kirtley L.C.D. M3's. are Nos. 463 and 646. No. 743 is one of the latest "D" class to be rebuilt, and together with No. 747 of the same class, often works to Holborn Viaduct in the morning rush hours. "E" Section 4-4-0's occasionally visit Holborn. E307 was there recently. 0-6-4T No. A598, working on the Charing-Cross-Tunbridge Wells services, is probably A611 renumbered, as was A129 some time ago. Nos. A161 and A310, are "H" class 0-4-4T engines and Nos. A208 and A215, are "F1" class 4-4-0 locomotives.—["TAMERLANE."]

S. & D.J.R.

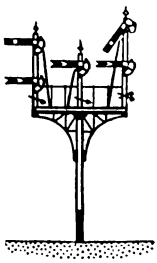
4 ft. 6 in. 0-6-0 No. 37, built in 1890, has been rebuilt with a Belpaire boiler, and is the first engine of its class to be so treated. 5 ft. 9 in. coupled 4-4-0 No. 17 has been fitted with a Belpaire boiler, similar to No. 45. The 13 4-4-0's comprise six 5-ft. 9-in. coupled engines, Nos. 14-18 and 45, two 6-ft. coupled engines, Nos. 77 and 78, and five 7-ft. coupled engines, Nos. 67-71.—["CONSOLIDATION."]

IRISH RAILWAYS.

Great Southern.

Great Southern locomotives recently renumbered include :—2-4-2T No. 438 and 4-4-0 No. 451 (D.S.E.R. Nos. 30 and 56) ; 4-6-0T No. 468 and 4-4-2T No. 481 (C.B. & S.C.R. Nos. 15 and 18) ; 0-6-0 Nos. 608, 623, 624 and 626. (M.G.W.R. No. 70 *Ballinasloe* and Nos. 35, 87 and 89) ; and 2-4-0's Nos. 651 and 661 (M.G.W.R. No. 16 *Rob Roy* and No. 17 *Reindeer*). Sentinel-Cammell motor coaches Nos. 354-357 are at Inchicore. They are painted in the standard G.S.R. passenger livery. Sentinel locomotives Nos. 1 and 2 are painted locomotive grey.—[K. A. MURRAY.]

Communications are also acknowledged from J. A. Hodge, A. H. Wild, D. S. E. Gudgeon, J. C. P. H., H. A. J. Pearmain, B. Perry, H.J.J.G., "L.Y.R." and others.



Digitized by Google

Digitized by Google

Digitized by Google

Photo.] [*Donatossian, Baghdad.*

TYPICAL PASSENGERS ON THE IRAQ RAILWAYS.

The Railways of Mesopotamia.

By RICHARD COKE.

THE railways of Mesopotamia, technically known as the "Iraq Railways" from the Arabic name of that country, which has now been officially adopted by the world at large, are largely a legacy of the Great War. Before the outbreak of hostilities the construction of only one line had been attempted, that being the Baghdad West–Samarah length of the famous "Bagdad Railway," built by the Germans and opened for traffic in the early part of 1914.

The first railway in Mesopotamia to be operated by the British was the metre-gauge line from Basra, the port of the country, to Nasriyah. This was opened in 1916, and was soon followed by the Kurna–Amara section, built first on the 2-ft. 6-in. gauge and afterwards converted to metre gauge. After the British occupation of Baghdad in March, 1917, new lines followed in quick succession, from Kut-el-Amara to Hinaidi (a military camp suburb of Baghdad), from Hinaidi to Baghdad East and Baghdad North, and from Baghdad East to Baqubah. All these lines were of metre gauge, the last mentioned being afterwards extended from Baqubah to Quaritu, on the Persian frontier. Through communication with Basra was maintained by a regular service of steamers on the Tigris from the port town to Kut. On the other, or western, bank of the latter river, the existing "Bagdad Railway," which was of standard (4-ft. 8½-in.) gauge, was extended at both ends; on the south to Baghdad South, then the site of the advanced Base military encampment and the principal British aerodrome, and later to Hillah, on the Euphrates; and on the north to Tekrit, and eventually to Sharqat, the site of the ancient Assyrian city of Ashur, and a point within eighty miles of Mosul. The Hillah extension crossed part of the site of ancient Babylon, and for the first time in history the iron horse penetrated within the walls

Digitized by Google

Digitized by Google

of that far-famed city. A "halte" was erected at the ruins for the service of military and civilian sightseers, but it was shortly afterwards removed bodily under cover of night by some of the adjacent tribesmen, to be used as firewood. In the cold winter evenings of Mesopotamia, wood is far too valuable as fuel to be wasted on an unattended station building!

A line of 2-ft. 6-in. gauge was shortly afterwards laid from Hillah to Kifl, and a standard-gauge track (afterwards converted to 2 ft. 6 in. and later dismantled altogether) from Baghdad South to Fallujah, on the River Euphrates, some distance north of Hillah. Fallujah is, incidentally, the modern representative of the town under whose walls was fought the famous battle described by Xenophon, in which Cyrus the younger made an unsuccessful bid for the Persian throne with the aid of the "Ten Thousand" Greek mercenaries. Much of the route of the dismantled railway is used by the new motor road constructed for the use of the cross-desert mail cars plying between Baghdad and the Mediterranean.

Altogether, by the beginning of 1919 over 1,000 miles of track had been laid, much of which has since been dismantled.

Early in 1918 a beginning was made on the construction of a through line from Basra to Baghdad. This used the old Basra–Nasriyah line as far as Ur of the Chaldees, whence it struck up the course of the Euphrates to Hillah, joining at the latter town the existing line from Baghdad West. The new line—which, in view of its length and importance, immediately became known as the main line by the public—was constructed on the metre gauge, the existing Baghdad West–Hillah section being converted at the same time from standard gauge to conform with it. Considerable difficulty was experienced in the work of construction, and it was not until January, 1920, that the first train ran through between the capital and the port of Sinbad the Sailor. In July of the same year occurred the rebellion, and

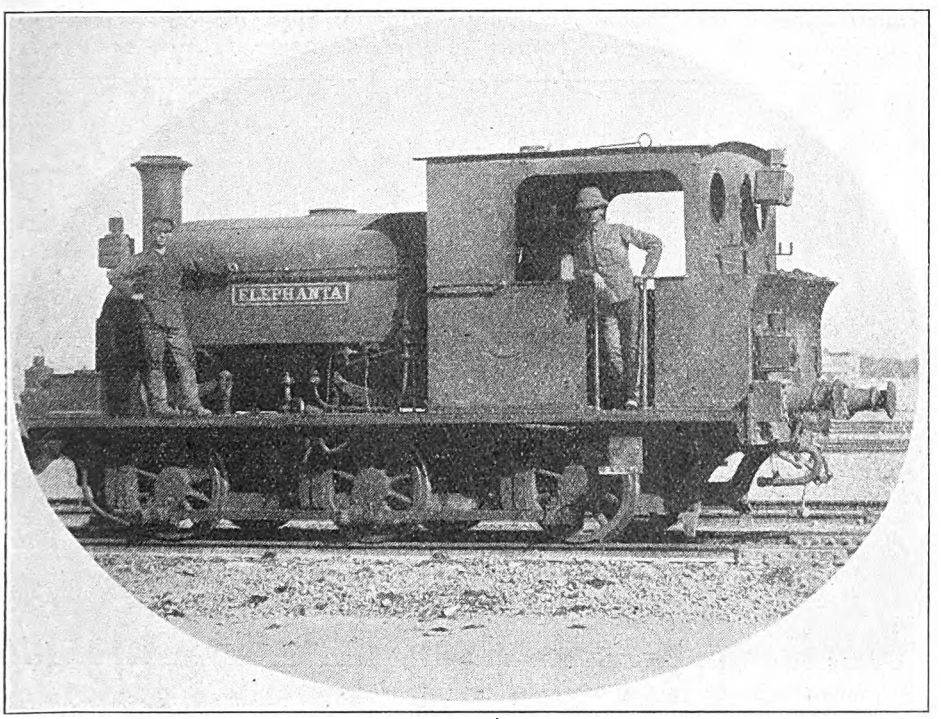


Photo.] [*Donatossian, Baghdad.*

SMALL 0-6-0 TANK LOCOMOTIVE USED DURING AND AFTER THE WAR ON NARROW GAUGE TRAMWAYS OF THE IRAQ RAILWAYS.

Digitized by Google

the line was "cut" in several places by the insurgent tribes; it was not until February, 1921, that it came into regular use again, but since that date the flow of traffic along it has been uninterrupted and ever-increasing.

In April, 1920, the administration of the railways was transferred from the military to the civil authorities, and a new policy (temporarily interrupted by the rebellion) was introduced, with a view to establishing the system on sound commercial lines. Hitherto, military policy alone had dictated the construction and working of the railways, and their existing lay-out bore no relation whatever to the commercial needs of the country. Great towns, such as Karbala, Najaf, Mosul and Kirkuk, were left many miles from a railway, while much of the track ran through undeveloped and desert land, entirely unremunerative from the traffic point of view. An additional difficulty was that the export trade of the country had been reduced to its lowest ebb by the War, while the import trade, owing to the presence of large numbers of British and Indian troops, was relatively heavy; as a consequence, there was always a shortage of return loads to Basra, leading to a large amount of empty running.

The five years which followed witnessed a wonderful change. The whole system had been overhauled, and very largely altered. Many of the old lines have disappeared, including the Kurna-Amara and Kut-Hinaidi sections, and the Hillah-Kifl and Baghdad South-Fallujah narrow-gauge roads. The Persian end of the system has been remodelled, a new line having been opened in 1922 from Khanikin Road to Khanikin town, where a thoroughly up-to-date passenger and goods depôt has been constructed for the reception of the Persian traffic. The old line from Khanaqin Road to Quaritu has been closed. The branch from Qaraghan, on the Baghdad-Khanaqin line, to Kingerban has been extended to Kirkuk. This branch will be extended later on to Mosul, thus at last bringing the big northern centre in touch with the railroad. The advantage of this route over the one *via* Sharqat (the proposed route of the old Bagdad Railway) is that, although rather longer, it passes through rich agricultural country all the way, whereas the terrain of the Tigris valley route is largely barren.

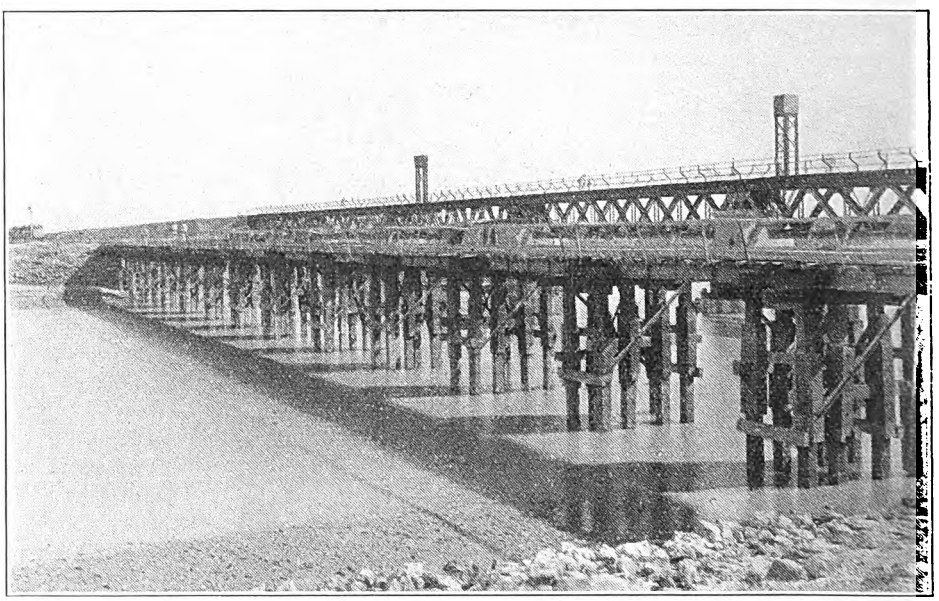


Photo.] [*John Soares, Baghdad.*

REPLACING AN OLD WAR-TIME BRIDGE BY A NEW ONE.

Digitized by Google

On the Western section of the system, the city of Karbala, one of the most important centres in the country, has been linked up with the main line by means of a branch from Hindiya Junction, close to the famous barrage across the Euphrates. The branch actually uses the barrage as a means of crossing the river. The main line itself has been diverted at this point and now runs through Museyib and past the barrage, instead of, as formerly, some miles to the south-east. Though adding a few miles to the length of the main line, the diversion is justified by the fact that it passes more important centres than the old route. The Karbala branch will eventually be extended to Najaf. Both towns are important business centres, and, in addition, as the two holy cities of the Shiah faith, attract a very considerable pilgrim traffic at certain seasons of the year. At the Basra end of the main line, a new branch has been constructed from Makinah, the terminus, to Basra City, thus bringing the railway nearer the heart of the town.

The system as it stands to-day thus consists of the main line Basra–Ur–Hillah–Baghdad West (360 miles), with branches from Ur Junction to Nasriyah (9·25 miles), and Hindiya Barrage to Karbala (22·5 miles); a line from Baghdad West to Shergat (187·66 miles); and, on the other or eastern bank of the Tigris, a line from Baghdad North through Baghdad East to Khanaqin (109·3 miles), with branches from Baghdad East to Hinaidi and Diyalah (11·63 miles), and from Quraghan to Kirkuk (108·15 miles). All the lines are of metre gauge, with the exception of the Baghdad West–Sharqat section of the old Bagdad Railway, which remains of standard gauge as originally built. The two divisions of the system on the east and west banks of the Tigris are connected by a wagon ferry which operates between Baghdad West and Baghdad North, crossing the river about a mile north of the city of Baghdad. The length of the spur line from one station to the other and the ferry crossing is 3·80 miles.

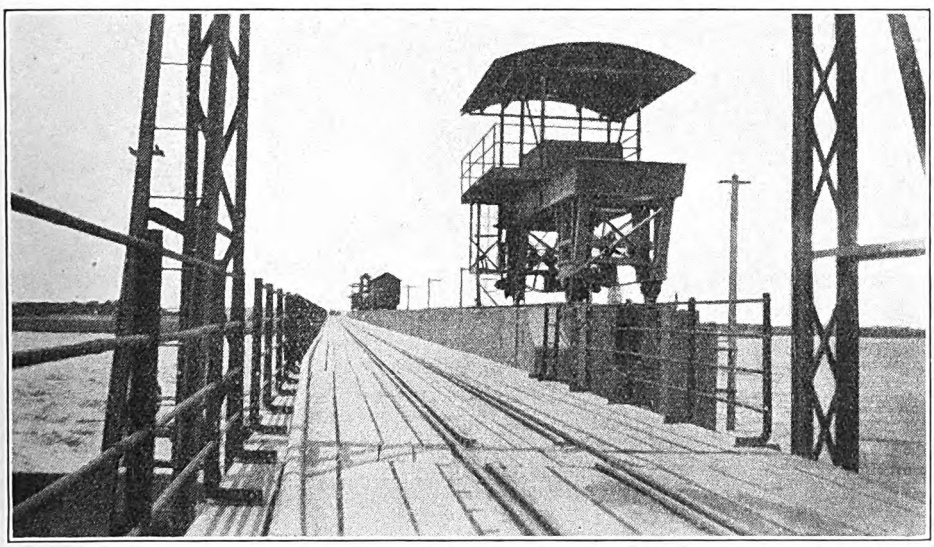


Photo. [*R. Coke.*

THE HINDIYA BARRAGE FROM ABOVE, SHOWING RAILS OF THE KARBALA BRANCH WHICH CROSSES IT.

Twice daily services of passenger and goods trains are maintained on all lines except the Baghdad West–Sharqat section and Qaraghan–Kirkuk, which each have a less frequent service. Generally speaking, trains are operated as "mixed," though in certain cases passenger and goods trains run independently. The through trains usually leave the termini at night, on the American and Indian model; this system has the advantages of enabling the pas-

Digitized by Google

sengers in summer to escape the glaring heat of the day and to wile away a portion of the admittedly rather tedious journeys in sleep. It has been found convenient, too, to marshal the freight cars at the various local stations in the evening, ready for attachment to the through train in the night.

Although travel on the Iraq railways is necessarily slow as compared with European standards, the comfort of the passengers is studied in a very thorough manner. New and up-to-date corridor stock, recently built in England to the order of the railways by the Gloucester Carriage & Wagon Co. Ltd., is in use for first-, second- and third-class on all long-distance trains; dining and sleeping cars run through between Baghdad and Basra. The journey between the two cities takes 21 hours by the mail train and 32 by the ordinary. Sharqat is 15 hours from Baghdad, Khanaqin 10, and Karbala 5. It is claimed by the management that the rolling-stock now in use is the finest in the East on metre-gauge systems. Refreshment catering, which used to be let out to contractors with not very satisfactory results, is now handled by the railway management direct.

The locomotive stock of the system is not particularly noteworthy, the majority of the engines having been imported from India during the War. On the standard-gauge line can be seen some fine examples of modern German 2-8-0 mixed engines, captured during the War, and a locomotive that had obviously seen prior service on the old L. & S.W.R. For some time the premier engines in use on the metre-gauge were the American Mallet compound 0-6-6-0's, built by Messrs Baldwin of Philadelphia. At one time the principal trains were almost invariably "horsed" by one of them, but their extravagance in fuel deprived them of their honourable position, and they have now been superseded by a series of new 4-6-0 English superheater locomotives, built to the order of the Iraq Railways by the Vulcan Foundry of Newton-le-Willows, Lancashire.

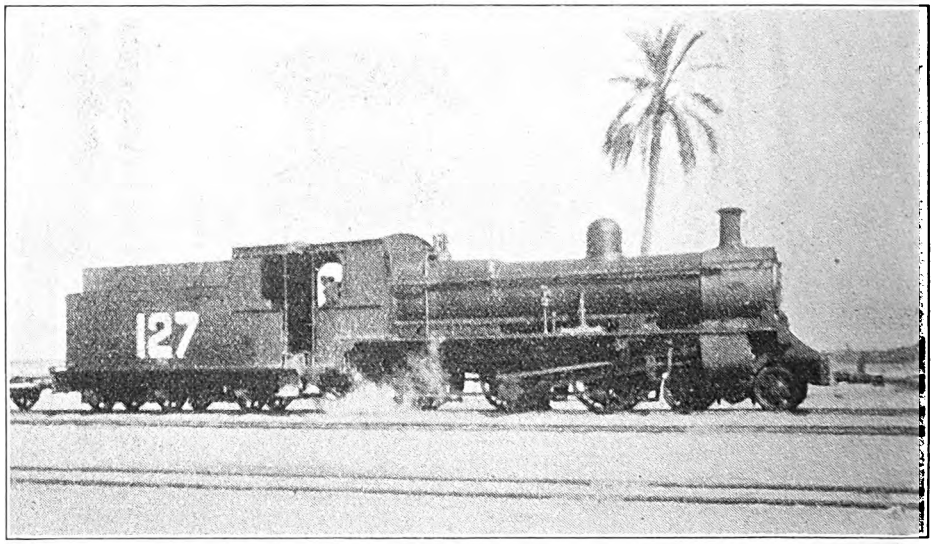


Photo.] [*R. Coke.*

4-6-0 BRITISH-BUILT "MIXED-TRAFFIC" TYPE LOCOMOTIVE, IMPORTED FROM INDIA.

Oil fuel is used exclusively on the whole system, and its high first cost forms one of the major difficulties in the economic working of the system. Fuel oil delivered in Basra costs Rs. 40 per ton, as against an average fuel charge on the Indian railways of Rs. 17 per ton. The comparison is not, however, a complete one, because the fuel chiefly used in India is

Digitized by Google

coal, and the calorific value of oil fuel is greater than that of coal; but the difference in price is still enough to embarrass the management of a small system in a poor country, strenuously endeavouring to cut costs at every available point.

New locomotive and carriage repair shops are now in process of completion at Salchiyah, a few miles north of Baghdad West station. The old shops, erected during the War at Shuaibah, near Basra, and Baghdad West, have now been closed down and dismantled. The executive offices of the system are at Baghdad West. There are "city offices" to deal with town passenger and goods inquiries in both Basra and Baghdad. The principal station on the system is Baghdad West, which consists of high- and low-level platforms some distance apart, the former serving the standard-gauge Sharqat line and the latter the metre-gauge Basra. Baghdad North, across the river, is the terminus for all Persian line trains, which also call at Baghdad East. The main station at Basra is at Makinah, from which a shuttle service is maintained to and from the new station at Basrah City. Another spur line from Makinah leads to Margil, close to the steamer wharves, and is used by the mail train on the arrival and departure of the Indian boats.

The Makinah site was originally selected for the convenience of the great army base camp, and is no longer suitable owing to its remoteness; a new alignment is to be used in the near future with its terminus at Margil, and an intermediate station nearer to Ashar, the commercial heart of Basra.

The territory covered by the Iraq Railways is remarkable for its historical and archæological interest. Excavations are now being carried on every winter at Ur of the Chaldees and Kish (near Hillah), both close to the main line, which also runs through a portion of ancient Babylon. The ruins of Nineveh, near Mosul, and of Ashur, are accessible from Sharqat, and the magnificent arch of Ctesiphon is an easy motor ride from Baghdad. The still-existing cities of Basra, Baghdad, Samarah and Mosul all contain imperishable memories of the past; and Karbala, Kufa, and Najaf loom large in early Moslem history and the stirring days of the Arab conquest. The tourist possi-

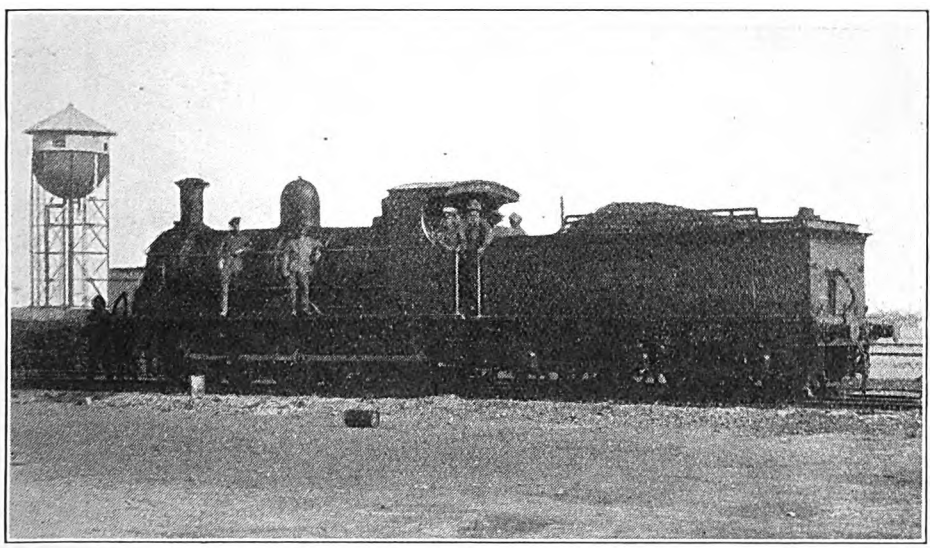


Photo.] [*Donatossian, Baghdad.*

L.S.W.R. 0-6-0 GOODS LOCOMOTIVE BROUGHT FOR SERVICE ON STANDARD GAUGE LINES OF IRAQ RAILWAYS DURING THE WAR.

One of this type is still in use.

Digitized by Google

bilities of such a terrain have not escaped the notice of the management, and an extensive advertising campaign is now being carried on in Palestine, Egypt, Syria and adjacent countries. The well-known firm of Thos. Cook & Son have recently opened a branch in Baghdad, and it is hoped that the winter seasons will see a large number of visitors from America and Europe enjoying the unsurpassed winter climate which Iraq possesses.

The part which has been played by the railways in the agricultural revival of Iraq is a creditable one. Without the railways, it would, indeed, be impossible nowadays for the grain grower of the Euphrates valley to market his produce in Basra and export it to foreign centres. The new scheme of cotton cultivation on the Dialah and the rich agricultural lands lying along the new Kirkuk branch promise to bring much additional grist to the mill of the railways. Incidentally, the growth of agricultural export is creating for the system the exact reverse of the traffic problem faced a few years ago. Whereas in the old days they were always sure of full loads up country, but had to run empty back, now the full loads are southwards to the port, and the lack of a satisfactory return traffic forms the difficulty. This is, however, only one of the minor difficulties which the management have to face. The high price of fuel has already been alluded to. In Iraq, labour is not only expensive, but extremely scarce, and skilled labour very rare. Many members of the trained staff have to be imported on the indenture system, involving much expense in passage charges, leave money, and extra wages to induce a good class of man to leave his own country for a term of years. The average cost per head of all personnel on the Iraq Railways is necessarily considerably higher than on comparable Indian railways. Staff charges represent, in fact, a substantial part of the working costs in Iraq. An additional trouble is that, in a country only just beginning to develop in the modern sense, the railways cannot carry nearly as much traffic as they could comfortably handle with no further increases in staff and equipment. This makes the factor of working unduly high. The 48,000–60,000 train-miles a month run at present could easily be increased to 75,000 without any further cost, except for fuel. The costs of staff charges per train-mile are nearly twelve times as large as they are on Indian railways, handling an adequate amount of traffic; if staff costs are deducted from the total working

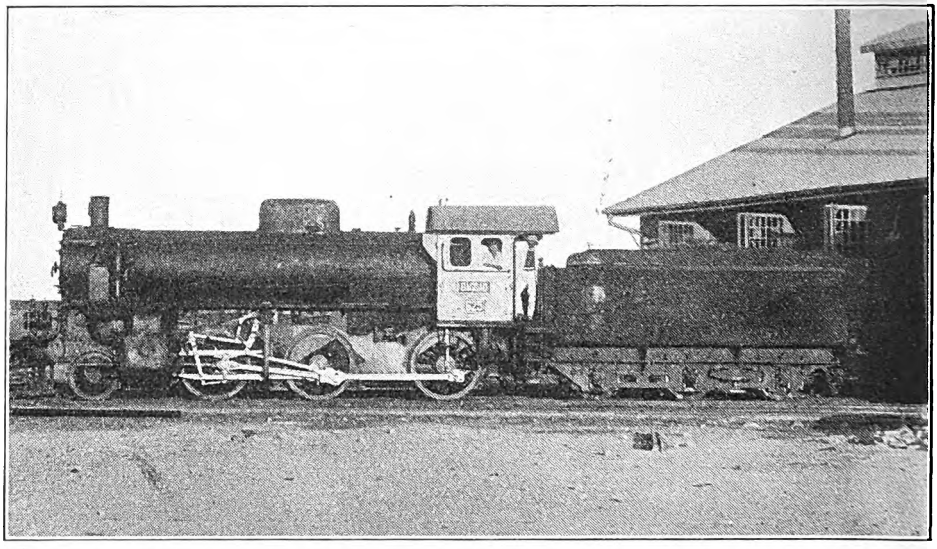


Photo.] [*Donatossian, Baghdad.*

GERMAN-BUILT 2-6-0 LOCOMOTIVE CAPTURED DURING THE WAR AND IN USE ON STANDARD GAUGE SECTION OF IRAQ RAILWAYS.

Digitized by Google

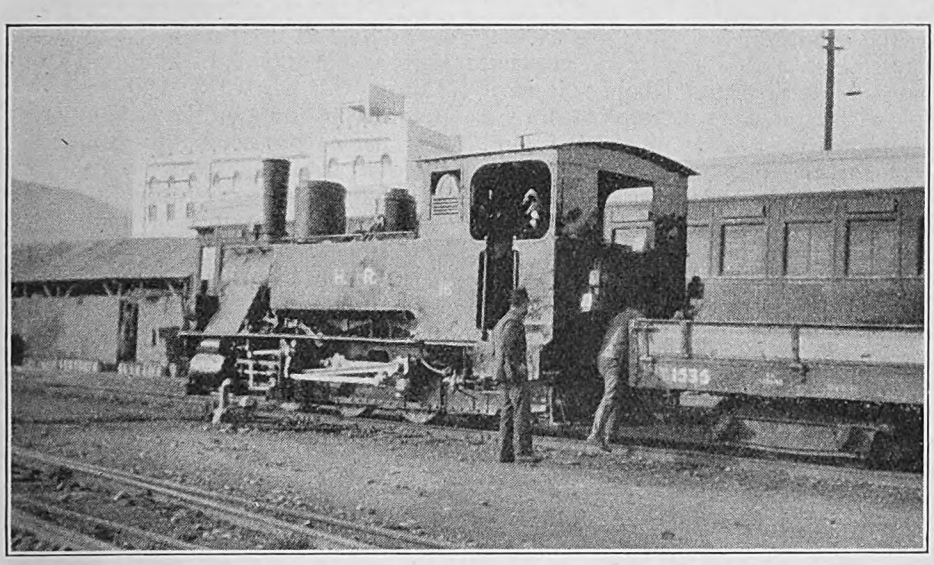


Photo.] [*R. Coke.*

HEDJAZ RAILWAY 0-6-0 LOCOMOTIVE No. 16, AT HAIFA.

Used on the Haifa-Acre branch.

costs, the remaining charges work out at nearly twice the figure of India per train-mile, and lastly, if the cost of fuel is deducted, the charges now remaining are only half as large again as India, showing clearly that the two great enemies of economical working on the Iraq Railways are fuel and labour costs. The former may tend to decrease as the oil fields of Iraq itself are opened up; it is difficult to see any immediate remedy for the latter, owing to the shortage of labour in the country itself, which will only become more pronounced as it is developed. More-

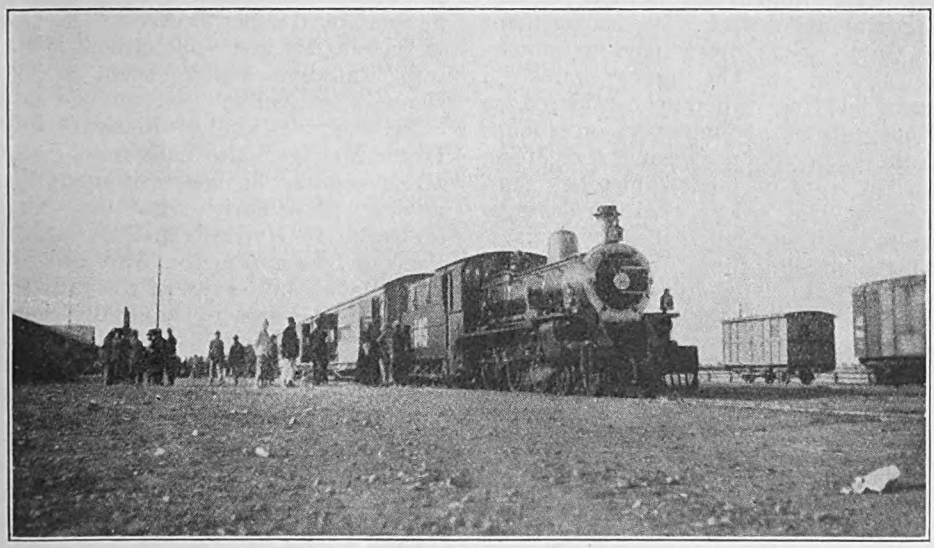


Photo.] **BASRA MAIL TRAIN AT BAGHDAD WEST.** [*R. Coke.*

British-built 4-6-0 mixed-traffic locomotive.

Digitized by Google

over, the countrymen of Iraq are natural agriculturists, and there is a growing demand for agricultural labour; it is of little use, therefore, to attempt to draw a good agriculturist away from the land merely for the purpose of turning him into possibly a bad railwayman. Again, much of railway labour is highly technical and technical training takes time; it would appear that it will be many years before the Iraq Railways will be able altogether to dispense with the importation of foreigners for their staff.

Not the least of the difficulties facing the railways is the uncertainty of their immediate future. Under the terms of the Anglo-Iraq Treaty, ratified in July, 1924, the system remains the property of the British Government, though operation is transferred to the Iraq Government. The latter have the option of purchasing the system at any time, on terms to be mutually agreed upon. During the Treaty period (four years), the British Government have also the right to sell the lines to a private purchaser, but only with the permission of the Iraq Government. At the end of the Treaty period, the railways are to be taken over, if still unsold, by the Iraq Government, on terms to be agreed upon with the British Government. The uncertainty regarding their fate effectually prevents any consistent scheme of development being brought into action, or any set programme of work. The management lives, so to speak, from hand to mouth. The railways are the largest industrial concern in Iraq, whether considered as revenue earners or employers of labour; and the enterprise responsible for getting them, in spite of great difficulties, into something like working order deserves more recognition than it usually receives.

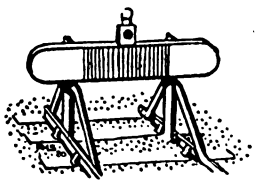
At the present time, the management of the railways is organised as a Government Directorate. The present Director, who for some time past has also acted as Adviser to the Minister of Communications and Works, is Lieut.-Col. J. Ramsay Tainsh, C.B.E., V.D., who received his practical training on the Caledonian Railway before proceeding to India to join the staff of that most progressive and successful Company's Railway, the Bengal and North Western, on which he spent over 20 years.

He came to Iraq in June, 1917, in the R.E. section of the Indian Army Reserve, and was attached to the Works Department as Assistant Director of Works in charge of the Basra Light Railway. Later he was transferred to the Iraq Railways, and was for some time Deputy Director of Railways at Basra before proceeding to Baghdad to take entire charge of the Loco. and Carriage Departments of the then three unconnected sections of the railway.

He assumed the duties of Director of Railway on December 11, 1921, and was confirmed in that post in 1923.

Mr. S. O. Heinemann, the Chief Engineer, has also spent most of his working life on Indian railways. Coming to Iraq with the British forces, he joined the railways in 1919 as Deputy Chief Engineer. He has occupied his present position since 1922. The senior locomotive officer and mechanical engineer is Major D. Yates, who has had a large and varied experience of marine and works engineering. During the War he was employed under the Works Directorate at Basrah, his first appointment with the Iraq Railways having been as Works Manager at Shaiba.

Mr. N. O'Reilly Blackwood, the Traffic Manager, also hails from India, in which country he has seen many years' service, particularly with the Nizam's Railways at Hyderabad. He also first came to Iraq during the War, and originally entered the service of the railways in the traffic department, gradually rising to his present position.



Digitized by Google

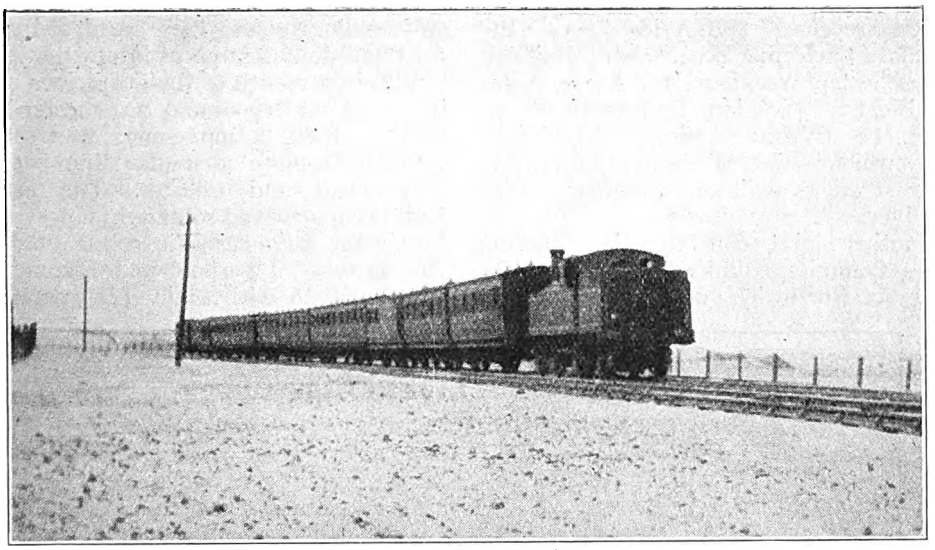


Photo.] **TRAIN APPROACHING NEW BRIGHTON, WIRRAL RAILWAY.** [*G. Ward.*
2-4-2T Locomotive No. 4.

The Railways of West Cheshire.

By R. S. McNAUGHT.

OF the many railway routes radiating from the historic city of Chester, not least in importance and interest are those serving the western corner of the county, including the Wirral Peninsula. In considering this region of comparatively level country and many rapidly developing towns and villages, the most striking feature to the railway student is that no fewer than three of the great companies hold important interests, while the remaining group, the Southern, takes a share in the through passenger traffic by virtue of popular through train services to and from the south and south-east coast resorts. There is, in addition, a short but vitally important line of independent ownership.

Reference to the accompanying sketch map will indicate that the London Midland and Scottish Railway holds predominant interests: in addition to Chester being a strategic point on its main line from Crewe and the Manchester and Liverpool areas to North Wales and Ireland (via Holyhead), it is a partner with the Great Western in the joint section to Birkenhead, with its busy branches to West Kirby and Helsby. There is a similar joint line running in an easterly direction from Chester to Walton Junction, onwards from which point it is entirely L.M.S., serving Warrington and Manchester (Exchange), although Great Western trains reach the latter station through running powers from Walton Junction. The remaining interest of the L.M.S. in West Cheshire is the former Wirral Railway, linking up the coastal residential area with the commercial districts of Liverpool and Birkenhead. This line is now known as the "Wirral Section" of the L.M.S.

Next in importance is the Great Western, whose main line from the south, west, and Cambrian section, approaches Chester from the south-west and continues from that city over the joint line to its northern terminus at Birkenhead (Woodside). It also reaches Manchester as has been explained.

The third company represented in West Cheshire is the London and North Eastern,

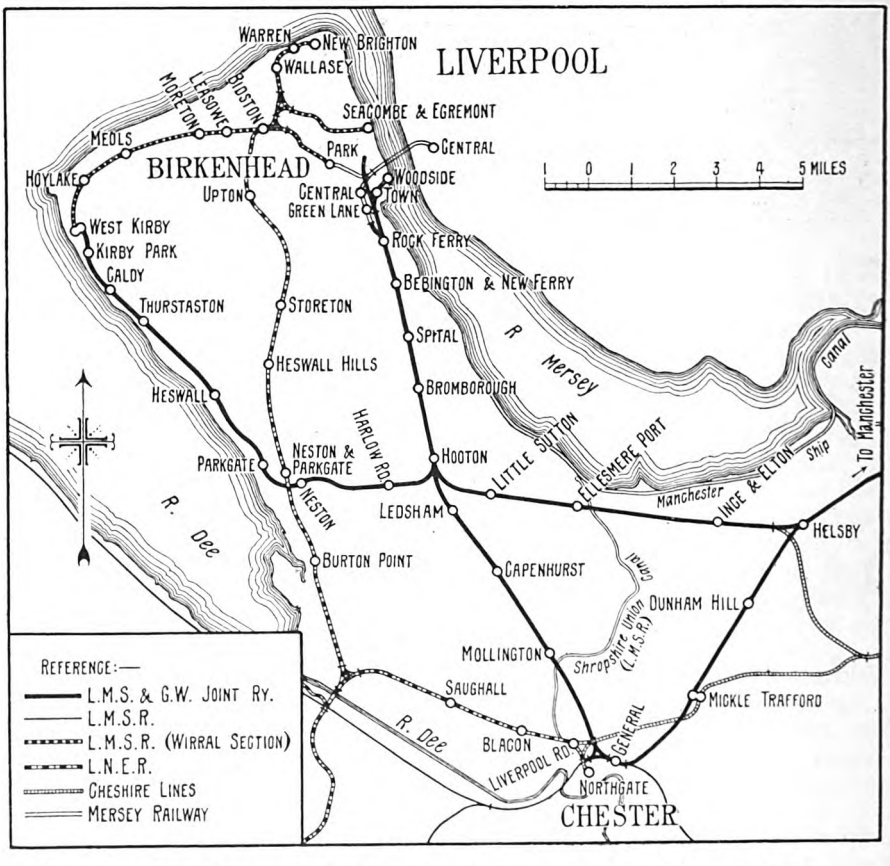
Digitized by Google

which reaches Merseyside over the metals of the former Great Central Railway from Chester, Wrexham, and North Wales to Bidston Junction, and thence over the L.M.S. (Wirral Section) to Seacombe, from which point Wallasey Corporation ferry steamers maintain a regular service to Liverpool.

Another joint concern, the Cheshire Lines Committee, links Chester with the East via Northwich, while the remaining railway in the district under notice is the short one referred to above—the Mersey Railway, which connects Birkenhead with Liverpool by means of a tunnel under the great river from which it derives its name.

The nature of the country placed few obstacles in the way of railway constructors in this district, but if the local lines lack engineering features of unusual interest, they merit a brief survey if only on account of the intensity and varied nature of their traffic in nearly every instance. A preliminary historical note concerning the various lines before they are described in turn will doubtless be of interest.

Within a month of the auspicious opening of the Liverpool and Manchester Railway in 1830, a movement was set on foot to promote a similar line between Birkenhead and Chester. The ground had been surveyed some years previously by George Stephenson in connection with the proposed Liverpool and Birmingham Railway, and with many Liverpool merchants and the citizens of Chester keenly supporting the scheme, it is surprising to know that it hung fire for a considerable time. However, while the Chester promoters were bent on seeing the most direct and easy route proceeded with (this, incidentally was the route selected by Stephenson) the Birkenhead party, including the Liverpool merchants, had an alternative project. This involved cutting through the sandstone backbone of the Wirral Peninsula, reaching Chester by a circuitous route, but the promoters claimed



Digitized by Google

that the greater engineering difficulties involved would be more than balanced by the cheaper land procurable and the obtaining of hard sandstone from the cuttings for other constructional work as the line progressed. Thus the local railway schemes, like so many of a later era, degenerated into a bitter topic of local politics and stormy meetings until 1837, when the promoters of each suggested line appeared before a Parliamentary Committee, and the ultimate decision was to proceed with Stephenson's direct route, 15¼ miles in length.

The Birkenhead and Chester Railway was opened in September, 1840, the Birkenhead terminus being at Grange Lane, a short distance from the Monks' Ferry to Liverpool, an undertaking which the company bought, including its fleet of small steamboats, in the following year. There were four intermediate stations, Bebington, Hooton, Sutton, and Mollington, and the original service was one of six trains daily each way, fares being 3s., 2s., and 1s. in inverse ratio to the class of carriage travelled in, third-class passengers being accommodated in open trucks.

Prior to the establishment of shipbuilding yards and docks at Birkenhead, the latter place was small and unimportant, and the fortunes of the railway undertaking were bound up with the working of the Mersey ferries to Liverpool. In addition to the Monks' Ferry, the company acquired the busier one from Woodside, but as the possession of neither included powers to lay rails to the waterside their maintenance was too great a burden, so in 1841 the Woodside Ferry was sold to the township while the now-defunct Monks' Ferry was similarly offered in 1842, although the latter purchase was never completed.

In 1847 the Birkenhead and Chester Railway became part of the Birkenhead, Lancashire, and Cheshire Junction Railway. An extension was made to the new Birkenhead Docks, and the new company doubled the line throughout. An Act was obtained for a branch to the Deeside villages of Neston and Parkgate, while services were improved all round, important concessions being obtained from the London and North Western and Chester and Holyhead Companies. The original Chester terminus, a small affair in Brook Street, was replaced by the extensive General Station which was opened in 1848. The completion of the Chester and Crewe line and the arrival of the Shrewsbury line made this step advisable. A new line leaving the Birkenhead and Chester Railway at Hooton gave a connection with the East via Helsby and Frodsham.

As from January 1, 1860, the company was taken over by a Joint Committee of the London and North Western and Great Western Railways, and a tunnel having been bored from near the original Birkenhead terminus to the riverside at Monks' Ferry, the new proprietors resuscitated the ferry service for some years, although it was later replaced by the more direct Woodside Ferry.

The original Grange Lane terminus of the railway at Birkenhead now forms part of a goods station and brewers' warehouse, while Monks' Ferry Station, adjoining the old ferry slipway, has been leased to a private concern and is used for the coaling of steamers. The present terminus of the L.M.S. and G.W. Joint Railways at Birkenhead is Woodside Station, situated near the floating landing-stage of the Corporation ferries to Liverpool, there being a highly-efficient service of both passenger and goods steamers at short intervals throughout the best part of the day and night. Opened in 1878, the station is a large brick and sandstone building of somewhat austere design. A curiosity is that the original approach road, frontage, and booking hall now form, so to speak, the back door. This change in the intended order of things came about through the inability of the railway company to secure a private approach pier for passengers passing to and from the ferry steamers, and has transformed a finely-planned terminus into one of undeserved mediocrity. To reach the ferry turnstiles passengers have to use a short length of public street, and the lofty and pretentious booking hall, now ignominiously positioned at the rear of the station, is used as a miscellaneous stores and annexe to the Parcels Office.

There are five terminal platforms, with two middle lines, one of which enables incoming engines to leave their trains, while the other is a handy standing place for short trains and engines during peak hours. The longest platform has a length

Digitized by Google

of 537 ft., and on the departure side of the station are laid out a separate engine siding and a turntable. The roof consists of two semi-circular curved spans, and the terminus is notable for its good light and airiness. At the departure end the station is crossed by a carriage road to the original main entrance, and again by a single span bridge carrying a public street adjacent to the tunnel. The booking offices of the respective companies comprise a neat wooden erection facing the circulating area, while extensive refreshment and waiting rooms adjoin No. 1 platform. The usual administrative offices are conveniently situated between the booking offices and the main hall referred to above. Just inside the present entrance, and handy for passengers proceeding to and from the ferry, are a large bookstall and a small enquiry office.

Up trains leaving Woodside traverse a tunnel 440 yards in length and on a rising gradient of 1 in 85. They then pass Birkenhead Town Station, near which is the end of the old tunnel to Monks' Ferry. The Town Station has two platforms and is now chiefly used by workpeople joining their trains and for milk traffic. Extensive carriage sheds and sidings are then passed on the up side, while the former engine shed (now a wagon repairing depot and warehouse) is on the down side. On this side the extension to the Docks, which is used exclusively for goods traffic, runs alongside the main line, and beyond it are the Corporation Gas Works, the engine sheds of the respective companies, and a large lay-out of coal sidings. The rising gradient eases to 1 in 100 for a short distance beyond the Town Station, and then assumes the moderate scale of 1 in 440, which, interspersed with practically level stretches, it adheres to for the next ten miles.

The line now skirts the great shipbuilding yards of Messrs. Cammell, Laird and Co., and a splendid panorama is afforded of the Liverpool South Docks, and the shipping in the broad Mersey. The electric Mersey Railway trains attain the level on the down side near this point, continuing alongside the Joint lines to their terminal platform at Rock Ferry. Quadruple track is provided on the main line from Green Lane Sidings Junction. Rock Ferry ($1\frac{3}{4}$ miles) is a busy suburban station where all trains stop to secure the connection to Liverpool via the Mersey Railway. There are four platforms and a double terminal bay for trains of the latter railway. At short intervals beyond Rock Ferry are the four-platform stations of Bebington, Spital, and Bromborough. Between the two

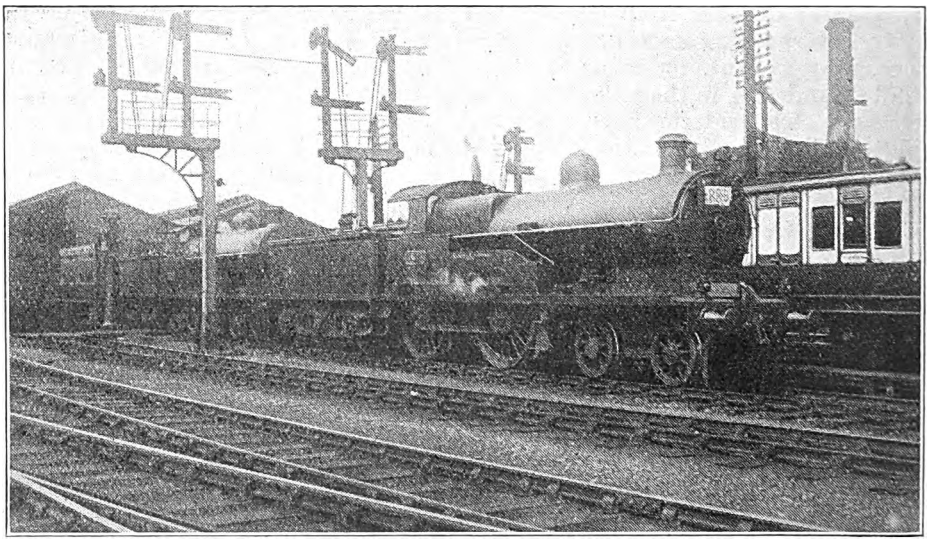


Photo.] UP IRISH MAIL AT CHESTER, L.M.S.R. [*J. Macartney Robbins.*
Superheated 4-6-0 No. 141 piloted by 4-4-0 No. 1623 "Nubian" with Belpaire firebox.

Digitized by Google

first-named the railway runs on an embankment past the celebrated model village of Port Sunlight; a picturesque view is obtained of the tree-lined roads, the beautiful church where the late Lord Leverhulme is interred, and the striking War Memorial. Before passing the extensive works of Messrs. Lever Brothers Limited, there is a wooden station for workpeople which has been erected within recent years. Its two platforms, linked by a subway, are the scene of most alert arrival and despatch operations when long workpeople's trains are dealt with morning and night.

Spital and Bromborough serve a large area where housing schemes are advancing apace, a remark which applies even more forcibly to Hooton Junction, the next station (7¼ miles) where the Helsby and West Kirby branches diverge to the left and right respectively. There are six platforms and also a bay used by Ellesmere Port and Helsby trains which terminate at this point, and north and south of the station are extensive sidings where workpeople's trains and reserve coaching sets are kept. Hooton also is a very important point for interchange goods traffic, and shunting operations are continuous.

One mile and a quarter beyond Hooton is Ledsham, shortly after passing which station the up and down slow lines rejoin the up and down fast, there being only a double line onwards to Chester. The remaining stations, Capenhurst and Mollington, serve old-world Cheshire villages, and are both trim and well-kept, the former especially making a brave floral display during the summer months. Beyond Mollington (12¼ miles) the line crosses the Ellesmere Canal by means of a short viaduct and descends gradually towards the county town, running through the celebrated nursery-grounds of Messrs. Dickson, which provide a fine sight when the flowerbeds are in full bloom. Overbridges carry the main road and the Cheshire Lines Chester-Northwich section, the run of 15¼ miles from Woodside terminating after negotiating the complicated approach to Chester General Station. It should be mentioned that a loop line, known as "the cutting," enables trains to avoid the station and pass direct on to the Great Western main line or that of the L.M.S. to North Wales and Holyhead, but this arrangement is not much used by passenger trains. The usual procedure is for Great Western trains from or to Birkenhead to enter a bay at the station: a fresh engine then backs on to what was the rear of the incoming train and continues the journey. L.M.S. through trains for the South are dealt with at a through platform, the same engine generally working from Birkenhead to Crewe or further.

The joint branches diverging at Hooton need but a very brief description, although their traffic is considerable. The line to West Kirby is single throughout, with passing-loops at every station excepting Neston and Caldy and Kirby Park. Between Parkgate and West Kirby, however, there is provision for doubling the branch should such a step become necessary. The branch is 12 miles in length, and, it may be mentioned in passing, is worked exclusively by tank engines. Leaving Hooton, it swings round towards the Dee coast, famous for its pleasant beach and good views of the Welsh mountains across the broad and sandy Dee estuary. Hadlow Road, the first station, serves the important village of Willaston, and, like other stations on the line, enjoys a considerable traffic of City business men who are fortunate enough to reside so far out of the smoky region. At Neston the L.N.E.R. line from North Wales to Seacombe crosses the branch, which now approaches the shore and taps the favourite residential centre of Parkgate. In former days, before the silting up of the River Dee channels and the development of the Mersey, a line of packet ships sailed from Parkgate to Ireland. To-day it is impossible for any craft larger than small fishing schooners to use this one-time port!

Heswall, Thurstaston, and Caldy are stations much used by excursion parties and half-day trippers in the summer, although with the phenomenal growth of bus traffic in Wirral the somewhat roundabout train service is at a disadvantage, good roads enabling the motors to cut directly across country from their termini at Birkenhead and Wallasey. West Kirby, the terminus, is a healthy little town famous for its views of the North Wales coast beyond the romantic islet of Hilbre,

Digitized by Google

which is accessible on foot at low tide. Every year adds to the popularity of this West Cheshire resort, and it possesses thriving shops and hotels. A single platform at present suffices for the joint passenger traffic requirements, but just beyond it is the more spacious terminus of the L.M.S. (Wirral Section). A physical connection enables through working between the two systems when necessary, and it is understood by the writer that extensive improvements and alterations are now to be proceeded with. The West Kirby line is more severely graded than any other local line, and it has several curves of small radius.

The remaining L.M.S. and G.W. joint line to claim our attention is the Helsby branch, which has a length from Hooton of exactly nine miles and is double throughout. The chief station is Ellesmere Port, a comparatively new town which owes much of its prosperity to its favourable position on the Manchester Ship Canal where that deep waterway is joined by the Ellesmere and other important canals. Since the war particularly the growth of the town has been phenomenal: there are now in active operation extensive iron and cement works and large flour mills, and, as will be expected, much heavy goods traffic is carried on. Helsby, while much less in size than "the Port," has an important electric cable works, and its prominent hill, a spur of the Overton Range, is always a popular summer-time half-day resort. Trains working from Hooton over the branch, with an occasional exception to Ditton Junction, terminate at Helsby, where they reverse at a platform adjacent to that on the Chester–Manchester line. The remaining stations, Little Sutton and Ince and Elton, serve villages of corresponding names.

Turning now to train services over the L.M.S. and Great Western Joint lines, it may be remarked that there can be few busier stretches of line in the provinces than the quadruple track between Green Lane Junction and Hooton. In addition to numerous goods trains from and to Birkenhead Docks, there is a daily average of 84 passenger trains arriving at Woodside terminus, and a more or less corresponding number of departures. Workpeoples' trains have also to be included, and at intervals during the day local stations are served by a Great Western motor-coach service operating between Woodside or Rock Ferry and Hooton, and vice versa.

The majority of the through trains are to and from the Great Western system. Expresses to Paddington leave Woodside at 6.35, 9.5, 11.45 a.m., 2.40 and 4.35 p.m. When Woodside was opened in 1878 there was only one train in each direction daily, consisting of two or three four-wheeled coaches! Now the most up-to-date Great Western stock, including luxurious dining cars, is employed. Other G.W. semi-fast trains terminate at Shrewsbury or Birmingham. Through down trains from Paddington, leaving there at 9.10, 11.10 a.m., 2.10, 4.10, and 6.10 p.m. reach Woodside at 1.58, 4.0, 7.18, 9.10 and 11.10 p.m. respectively. A through service to the Southern Railway is provided by the 8 a.m. ex Woodside to Dover, Deal, and Ramsgate, which leaves the Great Western system at Reading. There is one through service in each direction daily to and from the Kentish Coast, Great Western & Southern rolling-stock being employed alternately.

The remaining through service to the Southern Railway is the 9.35 a.m. from Birkenhead, which diverges from the Great Western line at Oxford and continues over former L. & S.W. metals to Bournemouth (arrive 5.14 p.m.), Southampton West and other South Coast stations are served by this extremely popular train which, like the 8 a.m., is made up of Great Western and Southern stock on alternate days. A dining-car is always attached, and frequently the south-bound express commences its long journey in charge of an L.M.S. locomotive to Chester. The return train leaves Bournemouth at 9.54 a.m. and reaches Birkenhead at 5.29 p.m. In both directions Great Western through carriages operating between Birkenhead and Cardiff and Plymouth are attached to the Bournemouth express as between Birkenhead and Shrewsbury and vice versa.

The West of England is also served by through coaches on the 11.45 a.m. and 2.40 p.m. London expresses already mentioned, these being detached at Shrewsbury. There are also two through connections leaving Birkenhead at 10.35 a.m. and 11.20 p.m. for Bristol and the West.

Digitized by Google

The remaining Great Western through services are to and from the Cambrian Coast, the 9.5 a.m. Paddington express taking a through section for Aberystwith (arrive 2.20 p.m.).

One other G.W. service deserving of mention gives direct communication between Wrexham and Birkenhead and vice versa. There is one train daily in each direction, leaving the Welsh town at 9.10 a.m. (Birkenhead arr. 9.57) and returning from the Merseyside borough at 5.6 p.m. At present this train shares with an L.M.S. Rhyl-Birkenhead fast train in each direction the distinction of avoiding the important station of Chester by means of the "Cutting" loop already referred to.

The L.M.S., having their own important termini in Liverpool, run fewer through trains to and from Birkenhead. Expresses to Euston leave Birkenhead (Woodside) at 8.55 a.m., 10.50, and 3.40 p.m. The first-mentioned is the "crack" train to Euston from the West Cheshire area: it arrives in town at 1.5 p.m. The return train, which leaves Euston at 5.20 p.m., due Birkenhead 9.40 p.m., is interesting in that it conveys the two or three through carriages for New Brighton, the corresponding "up" through coaches from the seaside resort being attached at Hooton to the 10.50 a.m. ex Woodside.

The frequent Joint service between Birkenhead and Chester enables good use to be made of the L.M.S. services to and from Crewe, Manchester, Llandudno, Holyhead, &c., converging on the old cathedral City. Services on the West Kirby and Helsby branches are also very frequent, there being twenty trains in each direction on the former and no less than twenty-three on the last mentioned during the course of each day.

The working of the L.M.S. and G.W. Joint Lines is entrusted to locomotives of both companies in roughly equal numbers. For passenger services the largest Great Western engines in evidence are the 2-6-0 mixed traffic 43XX, 53XX, 63XX, and 73XX classes, while 4-4-0's of the "City," "Flower," and "Bulldog" types also work regularly over the main line. Some of the old 35XX class, 2-4-0 with 5-ft. coupled wheels, work fast trains, as do 0-6-0 goods engines and tanks of the 2-6-2 and larger 2-4-2 classes. For branch trains, small tank engines of 2-4-0 or 0-4-2 wheel arrangement, and occasionally 0-6-0 pannier tanks, are employed. These well-known little engines handle heavy trains when called upon with the smartness which their contemporaries on the old Brighton line, the "Terriers," were renowned for.

L.M.S. locomotives of every Crewe-built type, with the exception of "Claughtons," represent that company, and latterly a fair number of Midland type 4-4-0 compounds and 0-6-0 engines have taken regular turns. Branch working is performed by 2-4-2 tank engines with 5 ft. 6 in. coupled wheels. Very often a "Prince of Wales" or "George" express engine works through Great Western expresses for Paddington and elsewhere between Birkenhead and Chester, also the 9.35 a.m. up and corresponding down express to and from the Southern Railway. Fast meat trains working from Birkenhead Docks, where there are very large slaughterhouses, are frequently taken charge of by engines of the simplified "Renown" and other ex-compound types, In passing, it may be noted that on one occasion prior to the grouping of the railways, the respective No. 1's of the two companies were observed together in Woodside Station. The L.N.W. locomotive was, of course, the well-known Precursor, No. 1, *Clive*, while the Great Western engine is a 2-4-0 side tank.

As it was very fully dealt with in the RAILWAY MAGAZINE for August, 1914, little need be said here about that short but busy line, the former Wirral Railway, now incorporated with the L.M.S. Its services, mainly passenger, are purely local with a single exception, and stations are very close together. Very large numbers of Liverpool city workers are transported in the morning and later afternoon to and from the favourite residential area bordering the Irish Sea coast. During the summer months, and particularly at holiday times, the line caters for an enormous number of day and week-end trippers, and many additional trains are run. There are terminal stations at Birkenhead Park, Seacombe, and New Brighton, in addition to a commodious station at West Kirby, where the line terminates. At Birkenhead Park passengers cross the platform to and from the Mersey Railway electric

Digitized by Google

trains, which convey them via the Mersey Tunnel to the centre of the city of ships within a very few minutes. Seacombe and New Brighton are termini from which the Wallasey Corporation steamers to Liverpool are conveniently reached, the former being also the Merseyside terminus of the L. and N.E.R. from North Wales and Chester. The main section of the Wirral Railway is from Birkenhead Park (jointly owned with the Mersey Railway) to West Kirby, a distance of 7¾ miles, with no less than six intermediate stations. Bidston Junction, an interesting lay-out of the "hour-glass" type, provides through facilities between Birkenhead and New Brighton, New Brighton and West Kirby, and Seacombe and West Kirby.

At present the only through connection to and from the Wirral section is represented by one or more through carriages running once daily in each direction between New Brighton and London (Euston). Instead of entering the terminal station at West Kirby, this train passes direct on to the joint line there, and is detached at Hooton to join a through express from Birkenhead (Woodside). This innovation has been very popular since its introduction in 1923, as the journey from Birkenhead to New Brighton, though only some 5 miles as the crow flies, is in actuality somewhat inconvenient, involving either the crossing of Birkenhead Docks by swing bridges, or a ferry trip to Liverpool landing stage, there changing to a Wallasey Corporation steamer, to complete the journey.

Since being taken over by the L.M.S., the Wirral line has been re-laid throughout, and comfortable modern rolling-stock placed in service. Train sets of eight vehicles, former L.N.W. and L. and Y. stock, are now used. Owing to the complicated nature of the line at its Birkenhead end and the numerous stations, no very high speeds can be attained, but the train service compares favourably with the highly-organised motor 'bus services with which the railway has to compete. Except for short lengths approaching the Merseyside terminal stations, the line is practically level throughout, but both the lay-out of Bidston Junction and the approach to Birkenhead involve the negotiation of some sharp curves. The locomotive sheds, repair depot, and carriage sheds are near Birkenhead North Station.

In the opinion of the writer, the Wirral line is admirably adapted to electrification, and the taking of this step would undoubtedly provide the Cheshire side of the Mersey with one of the finest and busiest suburban systems in existence.

The various tank engines of Wirral Railway design were, with a single exception, scrapped at Crewe when the line was incorporated in the L.M.S. It is now worked by L.N.W. pattern 0-6-2 tank engines of the well-known Crewe type, together with two former Lancashire and Yorkshire engines of the 0-6-2 and 2-4-2 wheel arrangements respectively. The latter machine, one of the original Aspinall radial-axle engines, has the distinction of being the first member of the Wirral section stud to sport the rich passenger engine livery of the L.M.S.

The remaining Wirral engine is a neat little 0-4-4 side tank built in 1912 by Beyer, Peacock and Co. This engine has 5 ft. 6 in. coupled wheels, weighs in working order 54½ tons, and was illustrated and described in the RAILWAY MAGAZINE for August, 1914.

Compared with the other railways of West Cheshire the route from North Wales to Merseyside, now forming part of the London & North Eastern Railway, does not go back very far. The first sod was cut near Hawarden Dee Bridge by Mr. W. E. Gladstone on October 21, 1892, and the new line, in conjunction with the Wrexham, Mold & Connah's Quay Railway, shortened the distance by rail between North Wales and Liverpool by something like 20 miles. While incomplete the line was taken over from its promoters by the Manchester, Sheffield and Lincolnshire (afterwards Great Central) for £96,000. Some twenty years ago powers were sought to construct a junction between Upton and Storeton stations, and from that point a line running through the suburbs of Birkenhead and linking up with the Mersey Railway at Birkenhead Central Station. Although much of the necessary land was purchased the proposal was not proceeded with. This scheme, incidentally, would have involved much costly tunnelling and fairly severe gradients.

L. & N.E. trains start from Seacombe station, which is in close proximity to

Digitized by Google

the ferry pier for Liverpool, and by virtue of running powers use L.M.S. (Wirral section) metals to Bidston Junction. They then curve sharply to the left and run parallel to the high ridge which includes Bidston Hill and Prenton Hill, following the contour of the Wirral Peninsula. Upton and Storeton are conventional wayside stations serving fast-growing residential areas, as is Neston and Parkgate, beyond which the West Kirby branch of the L.M.S. and G.W. Joint Lines is crossed, and the line descends to the Dee marshlands at and beyond Burton Point. The latter station is a popular resort for summer trippers. Before the Dee Bridge is reached a triangular junction gives access to Chester, there being certain through trains between that city and Seacombe The Chester station of the L. & N.E.R. is Northgate, situate quite near the larger and more important General Station. The engine sheds, sidings, &c., are on an embankment overlooking the L.M.S. main line to Holyhead, over which Great Western trains to and from the south-west work from Saltney Junction. Northgate possesses the neat and light appearance characteristic of the comparatively modern stations of the late Great Central Railway. Cheshire Lines trains to the east use it, crossing the Joint line to Birkenhead where the latter approaches the General Station.

Passenger trains on the L. & N.E. line are exclusively hauled by 4-4-2 tank locomotives of the former Great Central Railway, now repainted black and mostly fitted with the new standard chimney which, in this particular type, does not improve the design. Goods trains are hauled by 0-6-2 tank and 0-6-0 tender engines, also of Great Central origin.

It may be mentioned at this point that in addition to the locomotives engaged in normal traffic, there are a remarkable number of shunting engines of varied types and different ownership constantly engaged on the Docks estate at Birkenhead and Seacombe. Privately-owned dock engines are outside the scope of the present article, but Great Western "pannier" tanks are much in evidence, as are Crewe-built 0-6-0 saddle tanks of venerable age; also 0-6-0 and 0-4-2 engines with square tanks. A new L.M.S. standard shunting engine has also been added to the list. The L.N.E.R. dock duties are performed by 0-6-0 saddle and side-tanks with inside and outside cylinders respectively, all being of Great Central extraction. Shunting engines at the Docks have an American-type warning bell mounted on the cab or tank top.

The remaining railway in West Cheshire —the Mersey—has also received attention in the pages of the RAILWAY MAGAZINE, but in view of a recent development in its operation it merits a short notice. Opened in 1886 it was in 1900 that powers were obtained for the conversion of the line from steam to electric traction, a change which was accomplished in May, 1903, this being the first instance of the substitution of electricity for steam in this country. The Mersey Railway commences at Liverpool Central, its double-sided platform being below the Cheshire Lines' terminus of the same name. Descending underground to James Street it proceeds under the River Mersey bed to Hamilton Square, Birkenhead. Here it diverges, one branch continuing to Birkenhead Park, where it connects with the Wirral Section of the L.M.S., while the other extends to Rock Ferry, where, after attaining ground level and running alongside the L.M.S. and G.W. Joint Railway to Chester, it terminates, giving an interchange with traffic on that line. During "rush" hours a great density of traffic is dealt with, as many as 21 trains, carrying some 7,000 passengers, traversing the tunnel during one hour in one direction alone.

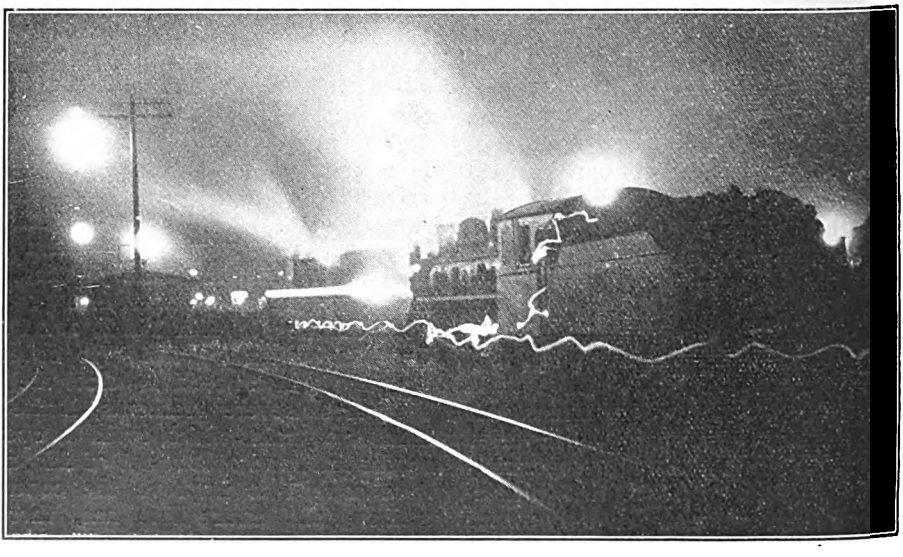
The operation of this dense service was formerly achieved by means of mechanical signalling, the operating problem being much accentuated by the physical difficulties of the line, which has gradients from its lowest level of 1 in 27 and 1 in 30. The time taken by trains to cover the long single block section below the river, with these severe gradients, limited the number of trains which could be operated on the line, and as a result of this, means were sought to improve the control of trains. The entire line has, therefore, been re-equipped with automatic signals working on the colour-light principle by the Westinghouse Brake & Saxby Signal Company. In addition to this step the novelty of installing an automatically-operated cross-over road and pair of catch-points, with their necessary signals,

Digitized by Google

was decided upon. This innovation was successfully brought into operation at Liverpool Central on February 4, 1923, and a further similar lay-out has since been completed at the same station. An arrangement with a time element in the control is installed, which takes 20 to 30 seconds to operate, and ensures that the train to cross over has come to rest within a certain section of the platform road. At the expiration of this time the cross-over is reversed, and the signal cleared for the train to run into the siding formed by the continuation of the down line beyond the end of the platform. When this train is in the siding the cross-over again switches itself to normal, and providing that the departure side of the island platform is clear of trains, and the lap beyond it, a pair of catch-points is reversed, and the signal cleared so that the train may be reversed to the platform to load passengers for the return trip through the tunnel. For this train movement no human operation is necessary in the signal cabins, although the adjustment of a lever reverts the cross-over to manual working.

A new and considerably improved entrance to James Street Station will be available from Water Street on the completion of a large block of offices now being erected over the sloping subway to the station from that street. Another up-to-date development of recent weeks has been the issue of cheap daily and weekly tickets available between the principal stations.

A PUZZLE PICTURE FROM NEW ZEALAND.



THE photograph reproduced, sent by Mr. W. W. Stewart, was taken in the locomotive yard at Auckland at night. Most of the light effects will be obvious, but we invite readers' suggestions as to the unusual markings around and upon the engine.

Digitized by Google

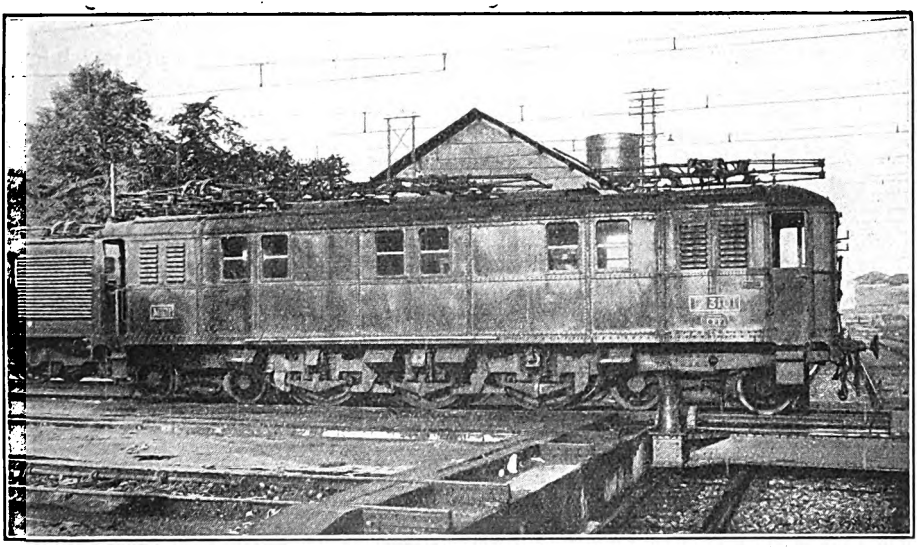


FIG. 10.—ELECTRIC LOCOMOTIVE, C. DE FER DU MIDI.

Heavy Electric Traction in France. [No. II.]

By THEODORE RICH.

IN order to handle high-speed international and other trains on the Bordeaux-Hendaye section, where gradients and curves are easy, a special design of electric locomotive was developed. On steam locomotives, apart from the wheels, balance-weights, axles, axle-boxes and coupling rods, the whole weight is sprung, and the centre of gravity is high. On an electric locomotive the motors are very heavy, and if supported on one side on the sprung truck frame and on the other side on the gear-driven axle, the unsprung weight is high and the centre of gravity of the locomotive is low.

One solution is to place one or more motors higher up on the truck and connect to the driving axles by connecting rods; this is done largely in Italy and Germany. Another method is to have concentric driving axles, the inner solidly attached to the wheels and the outer driven by gearing by one or two horizontal motors placed well up, the connection between the two axles being through springs or drag-links, so that the axle has a limited up-and-down movement independent of the driving motors. The engineers of the Midi Railway have tackled the problem in a remarkable way on their special high-speed locomotives. Each driving axle has a concentric quill axle fitted with two bevel wheels placed back to back, these wheels being driven by twin vertical motors through bevel pinions, the motor shafts being supported on ball-thrust bearings. By this means the unsprung weight is reduced to a minimum, the centre of gravity is kept high, and the motors are very accessible and can be lifted out through the roof of the cab. This type of locomotive weighs about 100 tons, with a wheel disposition of 4-6-4; the weight on each driving axle is 18 tons, and on the bogie axle 12 tons. Each motor has a capacity of 375 H.P., so that with three twin motor units the capacity is 2,250 H.P.

There are for normal passenger and goods traffic 90 double-truck electric locomotives weighing 72 tons each, with what may be termed tramway-type nose-suspended electric motors, one to each of the four axles; they are of 1,520

Digitized by Google

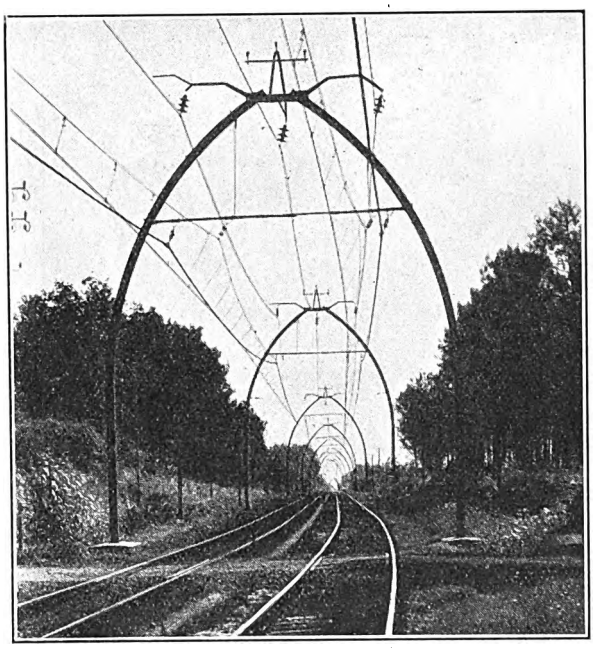


FIG. 11.—UNUSUAL DESIGN OF OVERHEAD SUPPORTS, BORDEAUX-DAX SECTION, C. DE FER DU MIDI.

combined h.p., and arranged so that by changing the gear wheels they can be run up to 55 miles per hour for passenger traffic, or 40 miles per hour for goods. There are also a number of suburban type all-steel motor coaches for local traffic, weighing 52 tons each, fitted with four motors each of 125 h.p.

The view above shows one type of support used on the Bordeaux-Dax section; it carries the trolley line, a feeder line at 60,000 volts, and a station lighting line at 10,000 volts. Owing to the use of an arch formation the strain on the foundations is reduced to a minimum so that this type of structure has proved to be very economical in erection and foundation costs.

A great deal of the electrical operating equipment of the power stations, substations and rolling-stock on the Midi Railway has been made by the Constructions Electriques de France, a company technically affiliated with the English Electric Company, whose designs, including their camshaft traction motor control system, have been adopted for a number of items.

PARIS-ORLEANS RAILWAY.

This company has an immediate programme for the electrification of nearly 600 miles of route which involves about 1,000 miles of track. Fig. 12 shows the lines taken in hand. For some time past suburban traffic from Dourdan to Paris *via* Bretigny has been operated electrically. The company has two main lines of traffic, one through Orleans and down the Loire to Tours and on to Bordeaux, and the second which serves the central plateau of Auvergne *via* Orleans and Vierzon. This latter section serves the important industrial cities of Bourges, and Limoges (well known for its chinaware), and Toulouse, also Mont Dore and other cure resorts and the picturesque valley of the Dordogne. The section from Paris to Vierzon, a distance of 127 miles, was opened for electric traction in December, 1926. Auvergne is an attractive tourist district famous for its extinct volcanos and numerous mineral springs and cure establishments. The western and southern slopes of this plateau, being more precipitous than on the north and east side, the watersheads draining largely in the same direction, this district is favourable to the development of water power. The station at Egeuzon is equipped with five turbine units of about 15,000 h.p. each, a station at Coindre under construction is to have five units of 13,000 h.p. each. The main transmission to Paris is at 154,000 volts, the layout of the mains being such that eventually the line can be connected up to the Alps on the east and the previously-mentioned power stations in the Pyrenees.

Electric power is supplied at the Paris end from the mains of a public supply company, and at the southern end from the new power station at Egeuzon (the first of a group to be constructed). A main transmission line connects Paris with the latter, so that to the extent of the hydraulic machinery installed the water power available at any season of the year can be utilised for railway purposes, and any balance available used industrially *en route* or in Paris to reduce the demands on steam power stations.

Digitized by Google

The electrical rolling-stock consists of a number of locomotives and motor-equipped passenger cars.

Several different types of locomotives for extra high speed have been undergoing tests, but for general work a useful type of locomotive, of which 80 have been ordered can be seen in Fig. 13. It was designed by the Oerlikon Company, the electrical part being made at the French Works at Ornans, in the Department of Doubs, the mechanical part being made by the Société de Batignolles, of Paris.

It is of the 0-4 + 4-0 type, weighing 75 tons, designed for passenger and goods service for a maximum speed of 62 m.p.h., with a drawbar pull of 10 tons at a speed of 27 m.p.h. It is arranged with electro-pneumatic control on the multiple-unit system, so that two locomotives can be coupled together if desired, and operated by one driver. The weight on each driving axle is about 18 tons, so it has been possible to adopt, without inconvenience from slipping, four motors, one to each driving axle, each motor being of 430 h.p.

The motors are arranged with nose suspension, like the motor of a tramcar, but owing to the amount of power developed in a small space forced ventilation is used to keep them cool. The trolley is of the Pantagraph type.

For much of the surburban passenger traffic motor coaches are adopted, the trains being made up into units of one motor-car and two trailer cars, one, two, or three such units being used to suit the traffic, the train being split up to serve branches when required. The type of motor-car used is the most powerful so far constructed in France. It is made with a steel body with a roof composed of aluminium alloy, the car body being lined with aluminium sheets. Each motor coach, Fig. 14, has a large central compartment seating 68 passengers, a smoking compartment to seat 14 at one end and a small baggage compartment with tip-up seats at the other end, there being standing room for a further 78. The total length of the car over buffers is 69 ft. 4 in., and weighs 62 tons. The central compartment reminds one of American construction, not being divided up by cross screens.

Each car is fitted with 18 electric radiators. Compartments for first- and second-class passengers are arranged on each train. The interior fittings are particularly pleasing. The driver's compartment at the rear end of the car is formed by swinging forward a glass and

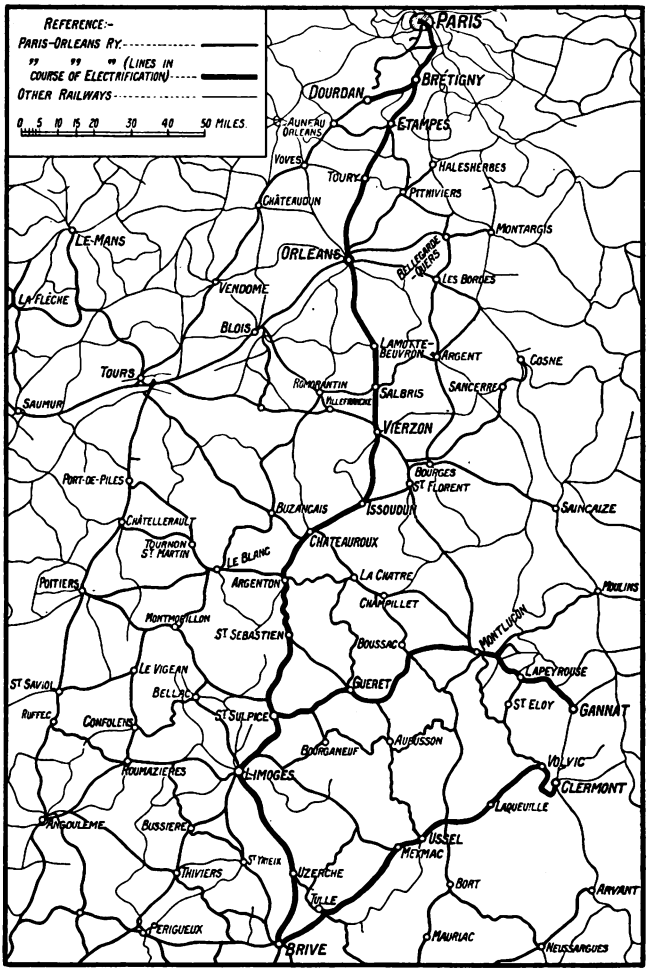


FIG. 12.—MAP OF THE PARIS-ORLEANS SYSTEM, SHOWING LINES IN COURSE OF ELECTRIFICATION.

Digitized by Google

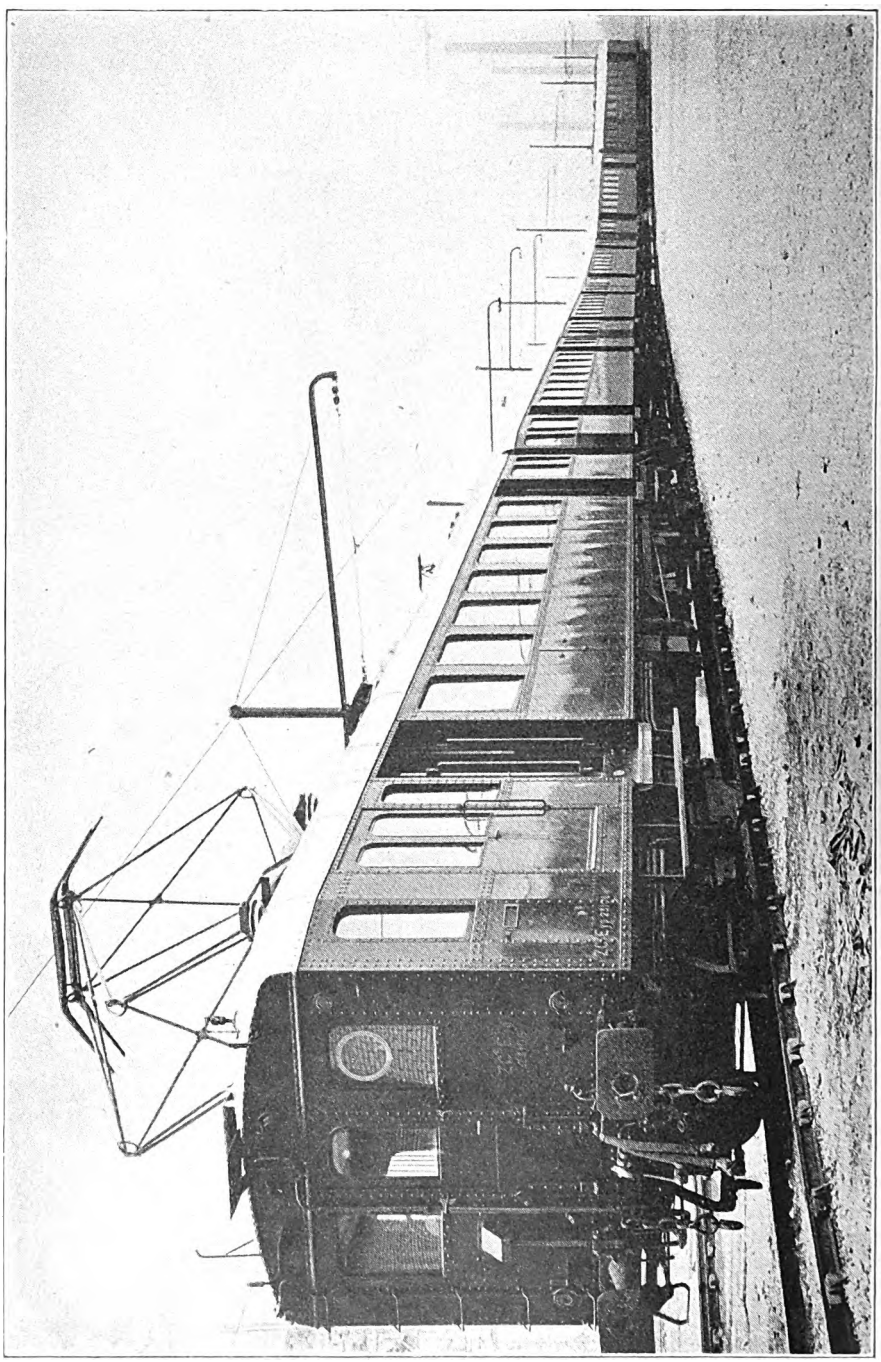


FIG. 14.—MOTOR-COACH TRAIN FOR SUBURBAN SERVICE, PARIS-ORLEANS RAILWAY.

Digitized by Google

metal screen across a corner of the passenger car, which when not in use as such is locked back, enclosing the driver's apparatus. Each motor-car is fitted with four motors of 235 h.p. each, and Thomson-Houston electro-pneumatic control. Owing to the powerful equipment, it is possible to reach a speed of 31 m.p.h. in 23 seconds, the maximum speed being 56 m.p.h. These cars were supplied by the Société d'Etudes pour l'Electrification des Chemins de Fer Français, an alliance of the French Thomson-Houston, the Schneider and the Jeumont Companies.

The contact wires (the main suspension cable is of phosphor bronze), each 107 sq. mm. section, are double, arranged on the catenary system, with an auxiliary carrier cable, the overhead work being supported at intervals of 210 ft. Fig. 15 shows the system used at Ivry outside Paris. The construction, horizontally, is very solid, the contact wires are slightly zig-zagged, so as to equalise the wear on the contact bow.

In the subway section, from the Austerlitz station to the Quay D'Orsay, and in the suburban section to Bretigny, a protected third-rail system is also used.

The line is supplied with current stepped down from the intermediate high-tension transmission lines at 90,000 volts, by means of substations placed 12 to 15 miles apart, the transforming plant consisting of static transformers and rotary converters. These converters are arranged two in series forming unit groups each of 2,000 kilowatts capacity, with a remarkable overload capacity of 6,000 kilowatts for five minutes.

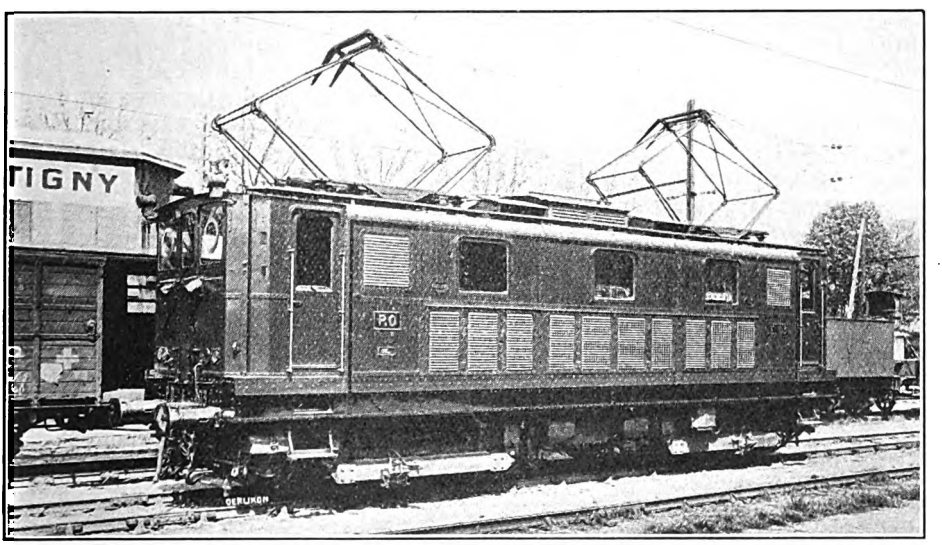


FIG. 13.—MAIN-LINE ELECTRIC LOCOMOTIVE, PARIS-ORLEANS RAILWAY.

Electrification of the P.L.M. Railway.

The P.L.M. Company, an undertaking which has a large proportion of its operating area within the economic reach of water-generated electric power, has, for some time, decided to electrify the section from Culoz to Modane. The former is the junction for Geneva, which lies to the south of Dijon, about 60 miles to the east of Lyons; the latter is close to the mouth of the Mont Cenis Tunnel, where the traffic is handed over to the Italian State Railways. This stretch, 83 miles in length, was chosen because at the upper end there are some very steep gradients of 1 in 33, electric traction giving special facilities for the handling of heavy trains under such circumstances; at the lower end ruling gradients of 1 in 100 and 1 in 120 are met with. Further, being in the middle of a water-power district, it is possible to obtain power at economical rates from several sources, which ensures continuity of supply. A

Digitized by Google

commencement has been made on the section between Chambéry and St. Pierre d'Albigny, a distance of about 15 miles. On this section several locomotives of different makes and systems have been tried out, drawing a heavily-loaded experimental train. The power is purchased from a group of water power undertakings in the neighbourhood. The third rail system is used with direct current at 1,500 volts. The rail is guarded throughout. Owing to the continuous slope from Modane, careful investigation is being made into the merits of different systems of power regeneration (that is, return of current to the line) when running down the grade. The problem is to find a system of control which will involve an absolute minimum of extra apparatus with a degree of fool-proofness which will enable steep slopes to be negotiated at a comparatively high speed and thus increase the capacity of the upper end of the line. The point is that, with a heavy train on a steep slope, any mistake in operating sequence can, in a few seconds, enable a train to get out of hand, and one of the difficulties in the adoption of any regenerative system on lines equipped for direct current operation, lies in the much more complicated apparatus required to give security as compared with the three-phase system.

Fig. 16 shows an experimental locomotive designed and built by the Oerlikon Company at their branch works at Ornans. This locomotive is of the 4-4 × 4-4 type, it is built up on two trucks, the forward truck having a leading bogie and the rear truck a trailing bogie. There are eight motors, two above each of the four driving axles, placed horizontally, driving through spring supported quill shafts. The body of the locomotive carries no driving strain, it is supported on the two trucks, the trucks being connected by specially-designed links.

When the locomotive is running down hill and recuperation is desired, in order to get reliability, the motors, when used as generators, are separately excited, and for this purpose a motor generator is provided, driven off 1,500 volts direct current. The master controller has been designed to obtain the maximum simplicity. Among other experimental locomotives in use on this stretch of line is one developed by the Thomson-Houston-Schneider-Jeumont Group. This is made up of two trucks, with 2-6 × 6-2 wheel arrangement, with six nose-suspended motors, two of the motors on each truck are mounted on the truck, the third being on an auxiliary truck with a leading or trailing pony wheel.

A 4-4 × 4-4 locomotive with eight motors, has been constructed by the Société Alsacienne Company, and a

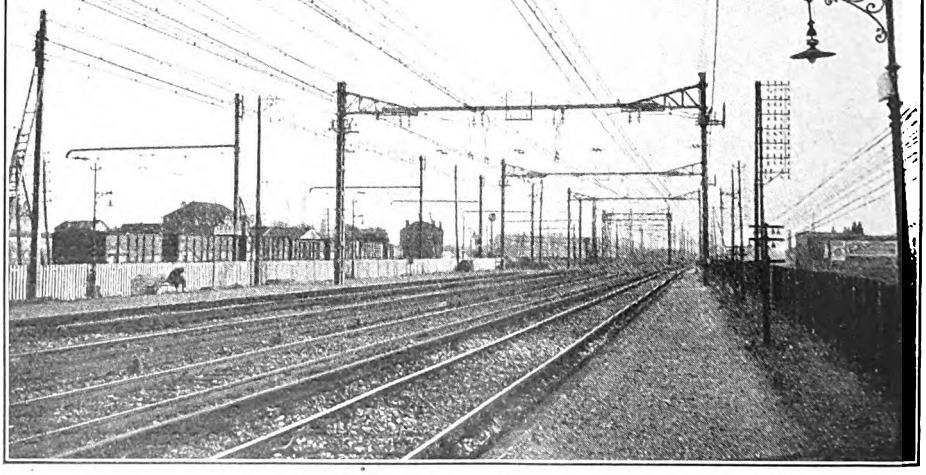


FIG. 15.—GENERAL VIEW OF TRACK AT IVRY, NEAR PARIS.

Digitized by Google

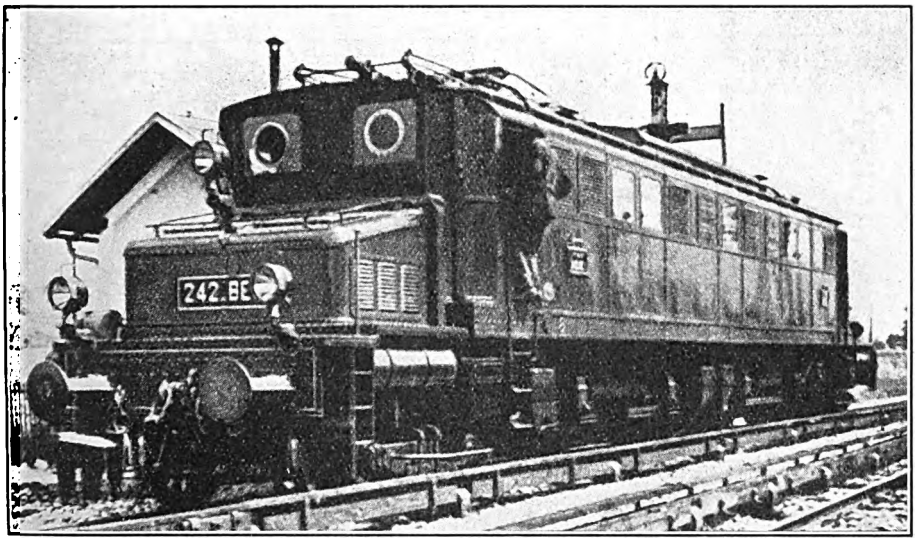
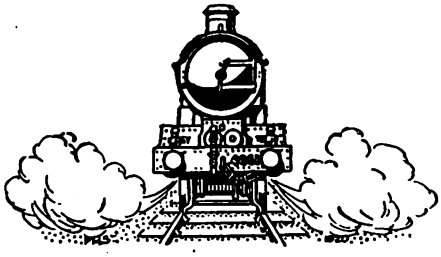


FIG. 16.—OERLIKON ELECTRIC LOCOMOTIVE, P.L.M. RAILWAY.

2-6 × 6-2 locomotive by the Fives-Lille Company. The current is supplied from sub-stations placed along the line.

The P.L.M. Company has in project the electrification of a busy section on the Riviera from Carnoules to Ventimiglia across the Italian frontier, a distance of about 100 miles. This section would serve a number of resorts along the coast, including Cannes, Nice and Monte Carlo, and enable a growing local passenger traffic to be handled with great facility. Power to supply this section would be obtained mainly from water-power stations situated in valleys in the Maritime Alps.

It might be pointed out to those who are interested in engineering and electric power matters that the engineering administrations of French railways generally, are usually very willing to give to those interested in such matters, facilities to see some of those works, constructions and apparatus of which French engineers and the French nation have every reason to be proud.



Digitized by Google

TOTAL WEIGHTS AND MAXIMUM AXLE LOADS OF THE LARGEST LOCOMOTIVES IN GREAT BRITAIN.

ARISING from an inquiry by a correspondent, we have prepared a comparative table showing the maximum weights of engines and tenders in working order, and the maximum load per axle for representative heavy locomotives, both passenger and goods, in service on railways within the United Kingdom. From this it will be noted that, when a comparison is made on the total weight in working order basis, the L.N.E.R. 2-8-0 + 0-8-2 six-cylinder "Garratt" articulated engine, weighing in working order 178 tons 3 qrs., is the heaviest locomotive in service; but the maximum load per axle is only 18 tons 6 cwt. 2 qrs., and it must be borne in mind that this engine is constructed for a special service on a particular section of the L.N.E.R. system and is not for use over all parts of the main line generally.

The G.W.R. four-cylinder express passenger locomotives of the "King George V" class, on the other hand, have a maximum axle load of 22 tons 10 cwt., which, at the time of writing, is the heaviest individual axle load to be found on any railway in this country. This is closely approached by the re-boilered Pacific engine, No. 4480, of the L.N.E.R., which has a maximum axle load of 22 tons 1 cwt. The total weights in working order of these engines, complete with tenders, are, however, 135 tons 14 cwt. and 152 tons 11 cwt., respectively. Until the last two years the maximum axle load permitted has been generally about 20 tons, but in the more recent big locomotive designs weights above this have become usual. The improvement and strengthenings carried out on the underbridges and permanent way have permitted greater adhesion weight and consequent increased tractive effort with higher boiler pressures being utilised.

—	Total Weight of Engine and Tender in Working Order.		Total Weight of Engine in Working Order.		Maximum Load per Axle.	
	Tons.	Cwt.	Tons.	Cwt.	Tons.	Cwt.
L.N.E.R.—						
3-cyl. 4-6-2 with 220-lb. boiler pressure	152	11	96	5	22	1
3-cyl. 4-6-2 with 180-lb. boiler pressure	148	15	92	9	20	—
6-cyl. 2-8-0 + 0-8-2	—	—	178	0¾	18	6½
3-cyl. 2-8-2	151	8	100	—	18	13
L.M.S.R.—						
3-cyl. 4-6-0	127	12	84	18	20	18
4-cyl. 2-6-0 + 0-6-2 ..	—	—	148	15	20	5
4-cyl. 4-6-4T	—	—	99	17	18	16
G.W.R.—						
4-cyl. 4-6-0	135	14	89	—	22	10
S.R.— ..						
4-cyl. 4-6-0	140	4	83	10	20	13
2-cyl. 4-6-4T	—	—	98	10	19	—

Digitized by Google

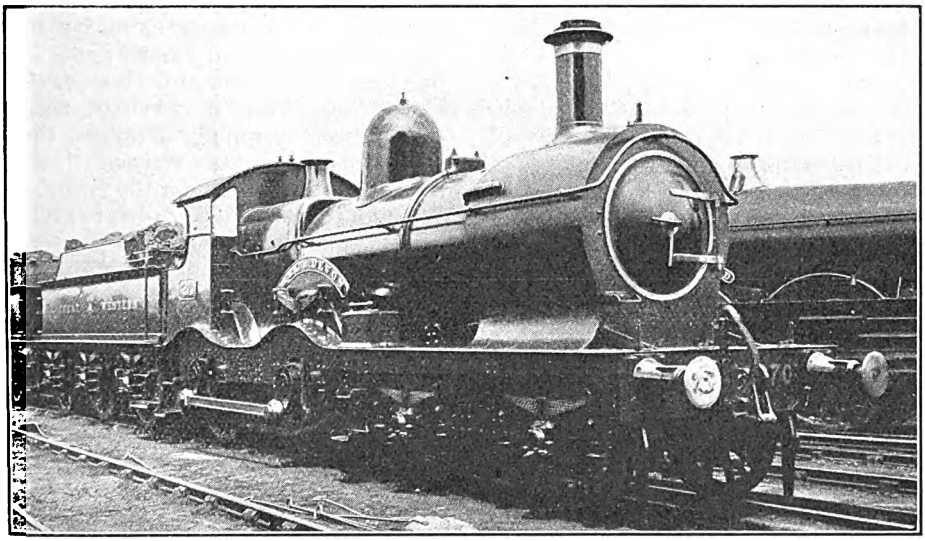


Photo.] [*W. H. Whitworth.*

4-4-0 No. 3270 "EARL OF DEVON," FITTED WITH TOP FEED.

Modern Locomotive Practice on the Great Western Railway. [No. III.]

By F. W. BREWER, A.I.Loco.E.

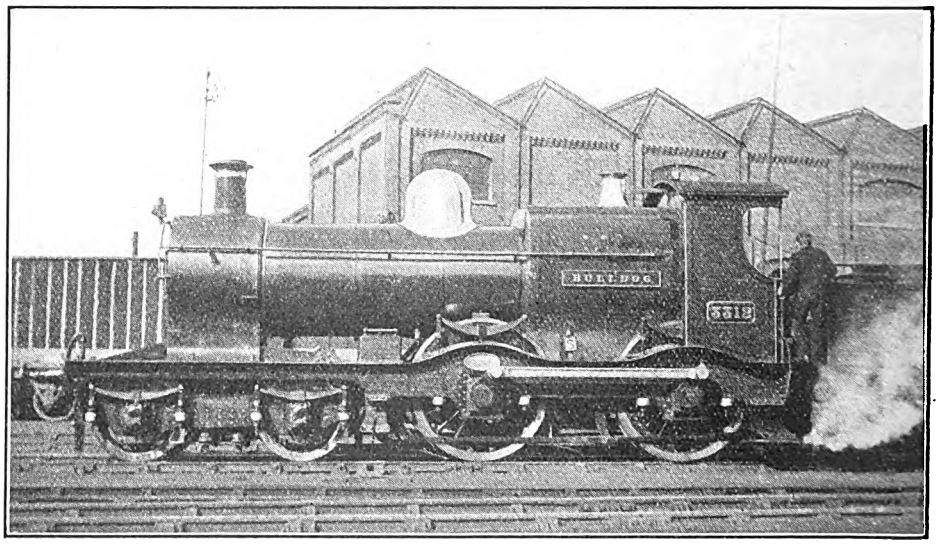
IN numerical order, the express engines which followed the 3232–3251 class of inside-framed 6 ft. 6 in. 2–4–0's of 1892–93 were Mr. Dean's so-called "Dukes," which were of the double-framed 4–4–0 type, the first series of which, Nos. 3252–3261, appeared in 1895. The "Dukes" were not, however, the first leading bogie tender engines on the G.W.R. They were preceded in 1894 by four express engines numbered 7, 8, 14 and 16, and named, respectively, *Armstrong*, *Gooch*, *Charles Saunders*, and *Brunel*. They were built to Mr. Dean's designs at Swindon, and had 20-in. by 26-in. cylinders, 7 ft. 1½ in. coupled wheels, and outside frames throughout. These four engines were fully described by me in the RAILWAY MAGAZINE for November, 1926, so that it will not be necessary now to make more than a brief reference to them. They were at first over-cylindered, and were afterwards fitted with 19-in. cylinders, but they were never considered to be as good as the 4–4–0 classes which came later, none of which had a cylinder diameter exceeding 18 in. The "Armstrongs" have now been rebuilt with 18-in. by 26-in. cylinders and 6 ft. 8½-in. driving wheels, and to-day they belong to the "Flower" class, but retain their old curved outside framing, also their former wheelbase of 7 ft. for the bogie, and 9 ft. for the coupled wheels, as compared with 6 ft. 6 in. and 8 ft. 6 in. in the case of the "Flower" class proper. I may add that they have been renumbered in the latter series as follows:—4169 *Brunel*, 4170 *Charles Saunders*, 4171 *Armstrong*, and 4172 *Gooch*. In the order here given, they were formerly Nos. 16, 14, 7 and 8.

The next 4–4–0 tender engines were, then, the "Dukes." Ten of these, Nos. 3252–3261, were turned out in 1895; fifteen, Nos. 3262–3276, in 1896; and fifteen

Digitized by Google

more, Nos. 3277–3291, in 1897. They were smart, successful little engines. As built, they had extended smokeboxes, domed boilers and round-topped fireboxes. The cylinders were 18 in. by 26 in.; the coupled wheels 5 ft. 7½ in. (later 5 ft. 8 in.); while the total heating surface was 1,400·85 sq. ft., the grate area, 19 sq. ft., and the steam pressure 160 lb. to 165 lb. They weighed 46 tons, and had 2,000-gallon tenders weighing from 24 tons to 27 tons 7 cwt. These tenders stood on a wheel base of only 11 ft. and had wheels of the Mansell carriage kind, with wood centres. The engine bogies had similar wheels. The general fittings of the engines included screw-reversing gear; two feed pumps; two injectors; and an air pump for maintaining the vacuum of the continuous brake. It has been said that the first of the "Dukes" initiated the use of extended smokeboxes on the G.W.R., but I believe that one of the Armstrong 0–6–0 goods engines, No. 426, built in 1868, and renewed in the eighties, was experimentally fitted with an extended, or partly extended smokebox, before the "Dukes" were constructed.

The latter were intended primarily for working over the hilly sections in Devon and Cornwall. Some ran between Newton Abbot and Penzance, and Plymouth and Exeter. Others, however, worked between Swindon and Weymouth, and a number were employed on fast goods trains between Paddington and Exeter. On the Devon and Cornwall services, their coal consumption per mile, at about the time when the engines were comparatively new, used to be 33·6 lbs.; on the Swindon and Weymouth route, 29·7 lbs.; and when working the Paddington and Exeter goods trains, 31 lbs. Two runs by engines of this class with the Hamburg-American specials (ex Plymouth to London, engines changed at Exeter and Bristol), in 1895, on November 28 and December 20 respectively, are worth quoting. Although the loads were somewhat light, the speeds were good when the steepness of the gradients between Plymouth and Wrangaton, and those, at 1 in 40, to 1 in 43, after passing Totnes, are taken into consideration. On November 28, 1895, the special consisted of seven vehicles, the tare weight of which was approximately 121 tons. This load was hauled from Plymouth as far as Exeter by No. 3256 *Excalibur*. The average speed to Newton Abbot was 44 m.p.h., and that to Exeter 51·4. The special on December 20, 1895, comprised six coaches, the tare load being about 115 tons. The engine on this occasion was the first one of the series, No. 3252 *Duke of Cornwall*, which ran to



4-4-0 No. 3312 "BULLDOG" AS ORIGINALLY BUILT.

Digitized by Google

Newton Abbot at an average speed of 44·5, and from there to Exeter at an average of 55 m.p.h. Between Teignmouth and Dawlish the maximum speed allowed was 35 m.p.h. The engines employed on each of the subsequent portions of the journey to London were 7 ft. 8 in. single-wheelers.

The rebuilding of the "Dukes" with Belpaire fireboxes was begun in 1901, and with Swindon superheaters in 1911. All of the engines now have Belpaire boilers, with domes, but not all of the class had been superheated at the time of writing. The steam pressure is now 180 lbs. per square inch, making the tractive force 18,955 lbs. The weight of the rebuilds is 47 tons 6 cwts. Larger tenders, of the later type, having a water capacity of 2,500 gallons, a wheel base of 13 ft., and a weight of 34¼ tons, have been provided. Spoked wheels for the tenders, and also for the engine bogies, were adopted from 1900 onwards. As in 1897, the "Duke"

"DUKE OF CORNWALL" CLASS.

4-4-0 Type.

ORIGINAL SERIES.

Coupled Wheels, 5 ft. 7½ in.

Old No.	Name.	Year Built.
3252	*Duke of Cornwall*	1895
3253	*Pendennis Castle*	,,
3254	*Boscawen*	,,
3255	*Cornubia*	,,
3256	*Excalibur*	,,
3257	*Guinevere*	,,
3258	*King Arthur*	,,
3259	*The Lizard*	,,
3260	*Merlin*	,,
3261	*Mount Edgcumbe*	,,
3262	*Powderham*	1896
3263	*Sir Lancelot*	,,
3264	*St. Anthony*	,,
3265	*St. Germans*	,,
3266	*St. Ives*	,,
3267	*St. Michael*	,,
3268	*River Tamar*	,,
3269	*Tintagel*	,,
3270	*Trevithick*	,,
3271	*Tre Pol and Pen*	,,
3272	*Amyas*	,,
3273	*Armorel*	,,
3274	*Cornishman*	,,
3275	*Chough*	,,
3276	*Dartmoor*	,,
3277	*Earl of Devon*	1897
3278	*Eddystone*	,,
3279	*Exmoor*	,,
3280	*Falmouth*	,,
3281	*Fowey*	,,
3282	*Maristow*	,,
3283	*Mount's Bay*	,,
3284	*Newquay*	,,
3285	*St. Erth*	,,
3286	*St. Just*	,,
3287	*St. Agnes*	,,
3288	*Isle of Tresco*	,,
3289	*Trefusis*	,,
3290	*Torbay*	,,
3291	*Tregenna*	,,

"DUKE OF CORNWALL" CLASS.

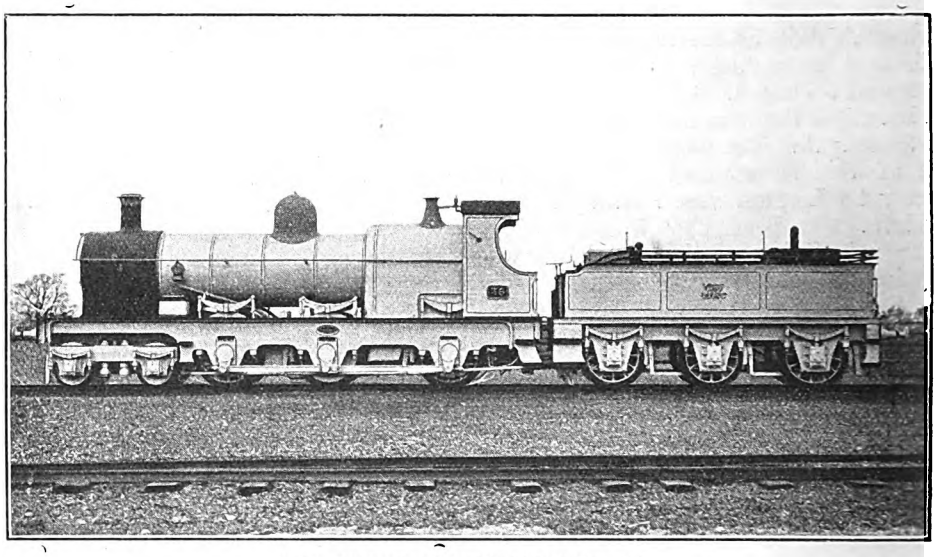
4-4-0 Type.

PRESENT SERIES.

5 ft. 8 in. Wheels.

Old No.	New No.	Name.	Year Built.
3252	3252	*Duke of Cornwall*	1895
3254	3253	*Boscawen*	,,
3255	3254	*Cornubia*	,,
3256	3255	*Excalibur*	,,
3257	3256	*Guinevere*	,,
3258	3257	*King Arthur*	,,
3259	3258	*The Lizard*	,,
3260	3259	*Merlin*	,,
3261	3260	*Mount Edgecumbe*	,,
3265	3261	*St. Germans*	1896
3266	3262	*St. Ives*	,,
3267	3263	*St. Michael*	,,
3270	3264	*Trevithick*	,,
3271	3265	*Tre Pol and Pen*	,,
3272	3266	*Amyas*	,,
3274	3267	*Cornishman*	,,
3275	3268	*Chough*	,,
3276	3269	*Dartmoor*	,,
3277	3270	*Earl of Devon*	1897
3278	3271	*Eddystone*	,,
3281	3272	*Fowey*	,,
3283	3273	*Mounts Bay*	,,
3284	3274	*Newquay*	,,
3285	3275	*St. Erth*	,,
3287	3276	*St. Agnes*	,,
3288	3277	*Isle of Tresco*	,,
3289	3278	*Trefusis*	,,
3290	3279	*Tor Bay*	,,
3291	3280	*Tregenna*	,,
3313	3281	*Cotswold*	1899
3314	3282	—	,,
3315	3283	*Comet*	,,
3317	3284	*Isle of Jersey*	,,
3319	3285	*Katerfelto*	,,
3320	3286	*Meteor*	,,
3321	3287	*Mercury*	,,
3323	3288	*Mendip*	,,
3326	3289	*St. Austell*	,,
3328	3290	*Severn*	,,
3329	3291	*Thames*	,,

Digitized by Google



4-6-0 GOODS LOCOMOTIVE No. 36.

class consists of 40 engines, but 11 of those belonging to the original series have been transferred to what is known as the "Bulldog" class, while the same number of the latter class have been merged into the "Duke" series. Some of the earlier "Bulldogs" were, by the way, similar to the "Dukes."

Formerly "Dukes," now "Bulldog" Class.

Old No.	Name.
3253	——
3262	——
3263	*Sir Lancelot.*
3264	*St. Anthony.*
3268	*River Tamar.*
3269	*Tintagel.*
3273	*Armorel.*
3279	*Exmoor.*
3280	*Falmouth.*
3282	*Marlstow.*
3286	*St. Just.*

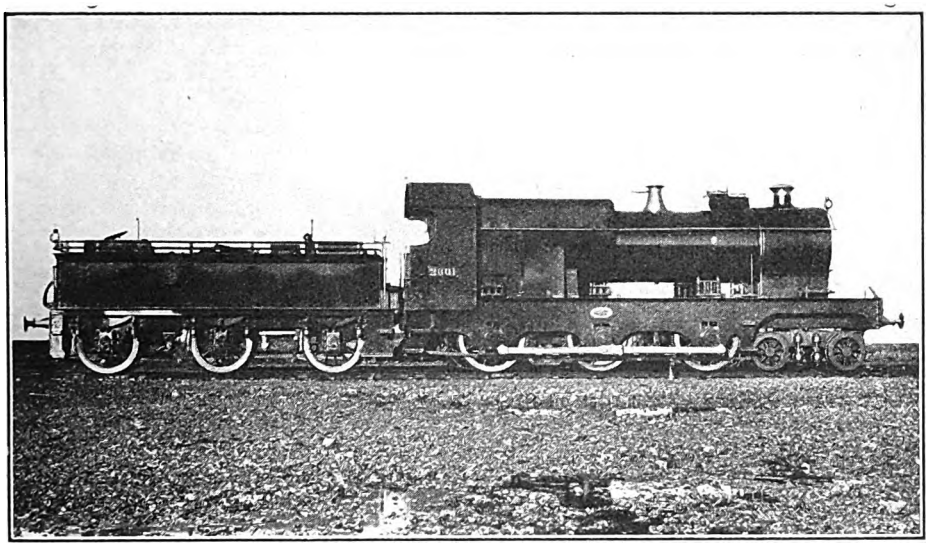
Formerly "Bulldogs," now "Duke" Class.

Old No.	Name.
3313	*Cotswold.*
3314	——
3315	*Comet.*
3317	*Isle of Jersey.*
3319	*Katerfelto.*
3320	*Meteor.*
3321	*Mercury.*
3323	*Mendip.*
3326	*St. Austell.*
3328	*Severn.*
3329	*Thames.*

It should be noted that old Nos. 3253, 3262, and 3314 are now running without names. They were formerly *Pendennis Castle, Powderham* and *Chepstow Castle.* These names are now borne by the "Castle" class of four-cylinder 4-6-0's, the word "Castle" being added in the case of "Powderham." Lists of the former and present engines of the "Duke" series, with dates of building, are given on page 285. As the engines have been renumbered, their old and new numbers are shown.

Leaving the "Bulldog" class for the time being, I must pass on to mention an engine of what was then an entirely new type on the Great Western Railway. This was an inside cylinder 4-6-0, No. 36, designed by Mr. Dean and constructed at Swindon in October, 1896, for heavy goods and mineral traffic. It had outside bearings for all wheels, an extended smokebox, a domed boiler, and a raised firebox which rested on the frames and had a grate 5 ft. 3 in. wide. I fancy that No. 36 must have been the first British standard gauge engine to have a wide grate, although the firebox was not, strictly speaking, of the Wootten type. The inside fireboxes of the old broad gauge 8-ft. singles of 1847 were virtually of the wide kind, and in form had sloping sides spreading out towards the foundation ring. Those fireboxes were, of course, carried down between the frames. The firebox casing of the 4-6-0, No. 36, was

Digitized by Google

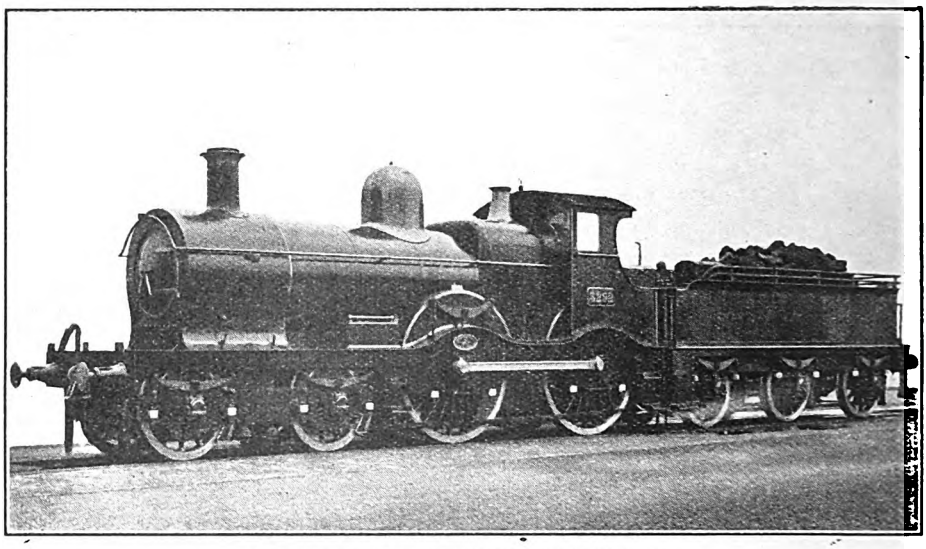


4-6-0 GOODS ENGINE No. 2601.

7 ft. in length and 5 ft. 10 in. in width, while the boiler barrel was 14 ft. long and had a maximum diameter of 4 ft. 7 in. The grate area was 35 sq. ft.—a large figure for those days—and an interesting feature was that the brick arch was supported by water tubes. The total heating surface was 1517·89 sq. ft., but as the boiler was fitted with "Serve" tubes, the amount was really greater. Including the ribs in these tubes, the total heating surface was computed to be 2,270 sq. ft. The cylinders were 20 in. by 24 in.; the bogie wheels, which were of the Mansell wood-centre pattern, were 2 ft. 8 in.; and the six-coupled wheels were 4 ft. 7½ in., the middle pair being the drivers. This engine, which had 165 lb. pressure, was an unusually powerful one for its time, and had a tractive effort of 24,260 lb., and a weight in working order of 59½ tons, with 47 tons 4 cwt. available for adhesion. The tender (2,600 gallons' capacity) weighed 33½ tons according to particulars published in 1897, but the weight, as recently given me, was 35¾ tons, the water capacity being the same, and the wheel base, as before, 13 ft. Designed more especially for working heavy trains on the Severn tunnel line, No. 36 was found to be capable of taking 30 loaded wagons and two brake-vans (gross weight of train about 500 tons) through the tunnel in 11 minutes, as compared with 35 wagons and two vans hauled by a couple of ordinary goods engines in from 18 minutes to 20 minutes. The engine remained the only example of its particular class, but, what may be called a variant of it, was built by Mr. Dean in 1899, and was numbered 2601. This variant was also a 4-6-0 with inside cylinders, and it was followed three or four years later by nine engines which were 2-6-0's, but which were otherwise virtually identical. These ten were known as the "Krugers." I may add that No. 36 was fitted with steam and vacuum brake apparatus, and with an exhaust injector. The engine was scrapped in 1905. It was not, of course, the first example of the 4-6-0 type in Great Britain, this type, but with outside cylinders and inside frames, having been introduced on the Highland Railway in 1894. But it was, I believe, the first 4-6-0 with inside cylinders.

The next engines to be described are the "Badmintons," as they were formerly called. They have been renumbered and included in the "Flower" class. They were double-framed 4-4-0's with 18 in. by 26 in. cylinders and 6 ft. 8½ in. driving wheels, and are more especially noteworthy for the reason that they were the first Great Western express engines to have Belpaire fireboxes. Twenty of the "Badmintons" were built, their old

Digitized by Google



4-4-0 No. 3292 AS ORIGINALLY BUILT.

numbers being 3292-3311, and their new numbers 4100-4119, *vide* the accompanying list.

G.W.R. ENGINES.

BADMINTON SERIES.

4-4-0 *Type.*

6 ft. 8½ in. wheels.

Old No.	New No.	Name.	Year Built.
3292	4100	*Badminton* ..	1897
3293	4101	*Barrington* ..	1898
3294	4102	*Blenheim* ..	1898
3295	4103	*Bessborough* ..	1898
3296	4104	*Cambria*	1898
3297	4105	*Earl Cawdor* ..	1898
3298	4106	*Grosvenor*	1898
3299	4107	*Alexander Hubbard*	1898
3300	4108	*Hotspur*	1898
3301	4109	*Monarch*	1898
3302	4110	*Charles Mortimer*	1898
3303	4111	*Marlborough* ..	1898
3304	4112	*Oxford*	1898
3305	4113	*Samson* ..	1898
3306	4114	*Shelburne*	1898
3307	4115	*Shrewsbury* ..	1898
3308	4116	*Savernake* ..	1898
3309	4117	*Shakespeare* ..	1898
3310	4118	*Waterford*	1899
3311	4119	*Wynnstay* ..	1899

The first one, No. 3292, was turned out in December, 1897, and was followed by Nos. 3293–3309 in 1898, and by Nos. 3310 and 3311 in 1899. The last engine but one, No. 3310 *Waterford*, differed from the rest in having a slightly extended smokebox, a somewhat larger and higher-pitched Belpaire boiler without a dome, and in having a cab with vertical handrails carried up to the roof. An almost identical cab had been fitted to the *Bulldog*, a 5-ft. 8-in. 4-4-0 built in 1898. The other 19 "Badmintons" had fully-extended smokeboxes, domed barrels, and old-style cabs, but the cab on No. 3292 had for a time a small window on each side. The boilers of these 19 were 11 ft. long by 4 ft. 5 in. maximum outside diam. The steam pressure was 180 lb. per sq. in., and the firebox grate area 18·32 sq. ft. Ten of the engines, Nos. 3292 and 3294–3302, had "Serve" tubes, and a total heating surface of 951·29 sq. ft., while nine—Nos. 3293, 3303–3309, and 3311—had plain tubes, and an aggregate heating surface of 1296·60 sq. ft. The weight of the engines, other than the *Waterford*, was 52 tons 3 cwt. The tenders weighed from 32½ tons to 36¾ tons.

Although included in the "Badminton" series, No. 3310 *Waterford* was, so to speak, an odd engine. Like the others, it had 18-in. by 26-in. cylinders, 6-ft. 8½-in. coupled wheels, and 180 lb. pressure. On the other hand, it had a non-domed boiler; this had a maximum outside diam. of 4 ft. 7½ in., and stood with its centre line 8 ft. 6 in. above rail level, as compared

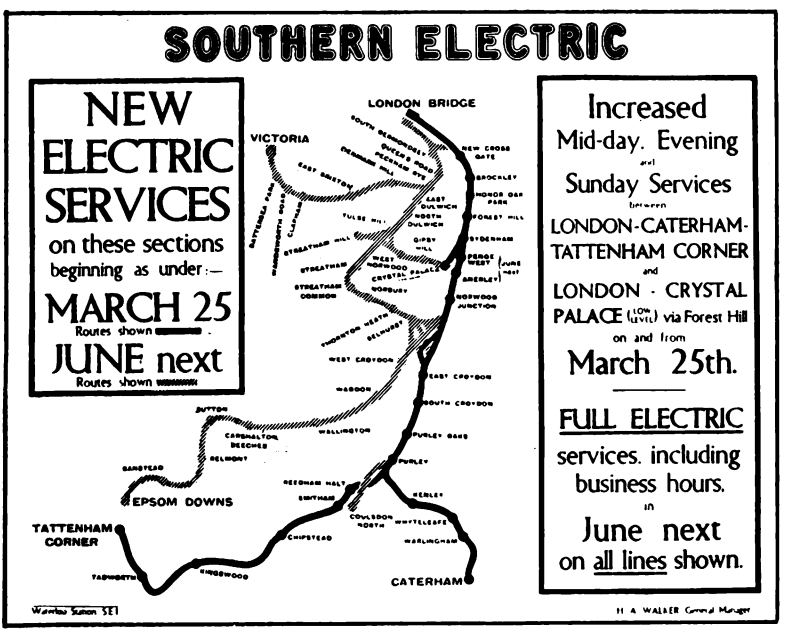
Digitized by Google

with 7 ft. 7½ in. in the case of the dome-boilered engines. It was said at the time that the boiler of *Waterford* was too large to permit of the use of a dome, whereas, as a matter of fact, there was room for a dome of moderate size. The total heating surface was 1,520·03 sq. ft., and the grate area—a bigger firebox being fitted—was 23·65 sq. ft. The tubes were of the ordinary kind. The *Waterford* weighed 52½ tons, and was provided with an exhaust injector on one side of the firebox, and with a re-starting injector on the other. It also had steam sanding apparatus, as did, I believe, the rest of the "Badmintons." It is of interest to note that all of the engines of this class originally had the main and coupling-rod cranks on corresponding centres on the same side. That is to say, the engines embodied the "Stroudley" practice in this respect. The "River" class, the little 6-ft. 6-in. singles, singles which were rebuilt as 6-ft. 8½-in. 2-4-0's in 1895–97, had the same crank arrangement, and the fine 4-4-0's of the "Atbara" series, which followed the "Badmintons" in 1900, also had it.

(*To be continued.*)

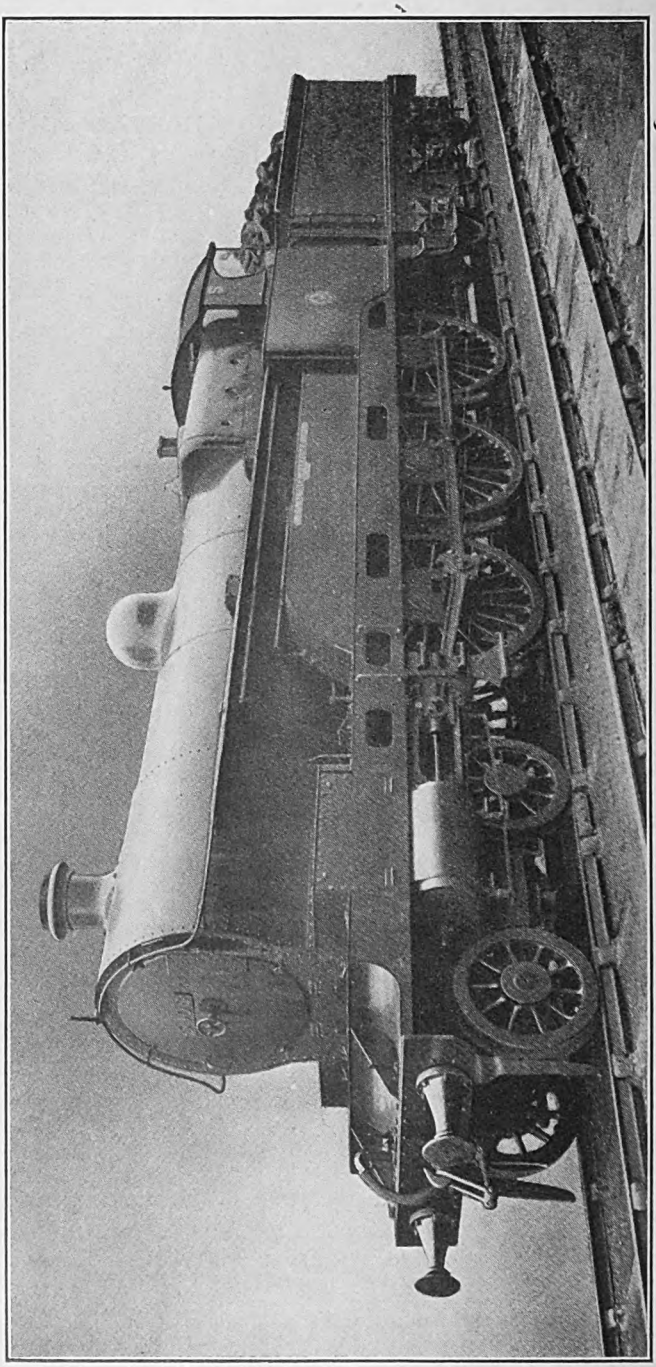
FURTHER ELECTRIFICATION ON THE SOUTHERN RAILWAY.

THE first stage, inaugurated on March 25, covers sections not hitherto equipped, and includes the equipment for conductor rail D.C. electric traction of the Central Section (late L.B. & S.C.) lines through New Cross and Forest Hill to Norwood Junction (with the branch to the Crystal Palace Low Level station) and thence *via* East Croydon and Purley to the Caterham and Tattenham Corner branches. Tattenham Corner station has hitherto been used only for race traffic, Tadworth being the ordinary terminus, but will now be opened for regular traffic. Further, the electrification of this branch will enable a great deal of the Derby traffic to be worked electrically this year. The next stage, due in June, will add the Sutton-Epsom Downs branch, and will cover part of the conversion of the existing overhead conductor A.C. system to the conductor rail D.C. system and enable electric services from London Bridge *via* Norwood Junction and on other routes to be introduced. The third stage, due for completion early next year, will add further routes. An interesting poster which has been issued is reproduced. This shows the March 25 and June 10 stages.



REPRODUCTION OF SOUTHERN RAILWAY POSTER ANNOUNCING NEW ELECTRIC SERVICES.

Digitized by Google



FOUR-CYLINDER 4-6-0 LOCOMOTIVE NO. 5908 "ALFRED FLETCHER" FITTED WITH CAPROTTI VALVE-GEAR.

Digitized by Google

The Caprotti Valve Gear applied to Locomotives.

THE various forms of link motion employed for distributing steam to the cylinders of locomotive engines suffer from the fact that any alteration in the point of cut-off will also affect other phases of the steam distribution throughout the forward and return strokes. Thus, if the point of cut-off is made early, that at which the steam is released will be correspondingly early, as will be also the point at which the exhaust port is closed for compression. Corresponding difficulties also apply to some degree to radial types of valve gear.

This is partly the reason why many locomotive engines cannot be notched-up to work at very early cut-offs. The angularity of the connecting-rod also affects all points of distribution, so that the point of cut-off of the front port will not agree exactly with that for the back. In order to overcome this disadvantage, engineers have for many years endeavoured to evolve a more suitable form of valve gear for locomotive operation.

The Caprotti patent gear, employing poppet valves for steam distribution, is one solution of the difficulty. The motion for actuating the gear is derived from a bevel gear-wheel keyed to the main driving axle of the locomotive. This wheel drives another bevel fixed to a long shaft O (Fig. 5) running to the front end of the engine, which in turn gives a rotary motion to a horizontal shaft J (Fig. 4) arranged transversely across the locomotive above the cylinders. This shaft actuates a number of cams which cause the valves, of poppet type, to open and close in the proper sequence.

Each cylinder has a set of four valves A, A (Figs. 1 and 2), arranged with their spindles placed vertically. They are set in pairs (one admission and one exhaust) at each end of the cylinder casting. For operating the four valves for each cylinder three cams are employed. Two of these, B and B¹ (Figs. 1, 3 and 4) control the steam valves, and one, C (Figs. 2 and 4) the exhaust. The profiles of these cams are such that, as they revolve, they cause the valves, through the bell cranks shown in Figs. 1 and 2, to lift and remain open for a pre-arranged period in proper sequence during each stroke of the piston.

By this arrangement it will be seen that the various events in the steam distribution in the cylinder are separated, and any alteration in the point of admission and cut-off controlled by cams B and B¹ will not affect in any way the points of release and compression which are controlled by the separate cam C. The two steam cams B and B¹ are mounted close together, loosely on the spindle J, while the exhaust cam C is mounted at the opposite end, Fig. 4. The intervening portion of the spindle is screwed to a quick pitch, and on it are mounted two cylindrical pieces, G and G¹, which, by means of small rods K and K¹, fixed rigidly in one or other of the sleeves and one or other of the cams as necessary, and passing through slots in the other cylindrical pieces and intervening cams, control the movements of the cams.

The elongated slots L in the cylindrical pieces enable the cams to be reversed in direction and take up their functions again in the steam distribution at the appropriate point in the travel of the piston. The cylindrical pieces are surrounded by sleeves F, which are very similar to the familiar eccentric straps. A system of levers and cranks E, connects the eccentric straps F to the shaft D, which, in turn is controlled from the driver's cab, and by moving the cylindrical pieces along the screwed portion of the shaft J, effects the reversal and alterations to the points of cut-off of the engine.

Each set of cams for working one cylinder is arranged in a separate casing so as to enable it to be connected up to a similar casing mounted upon the adjoining cylinder. Four unit casings are required for a four-cylinder engine and for a two-cylinder engine, two will be necessary. The gear for the most part runs in ball bearings, and the box casings are oil tight and dust proof, so that with the employment of this type of gear there is a very considerable reduction of frictional losses. The valves also, being

Digitized by Google

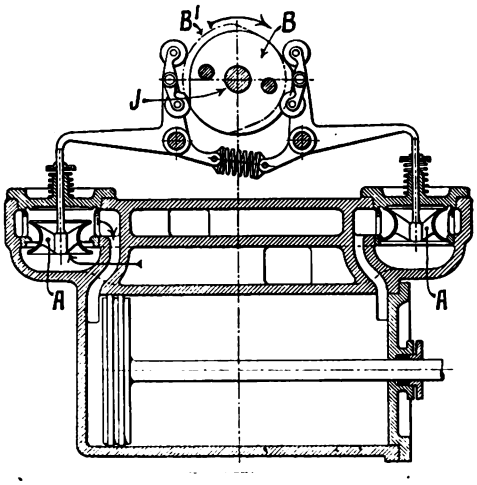


FIG. 1.

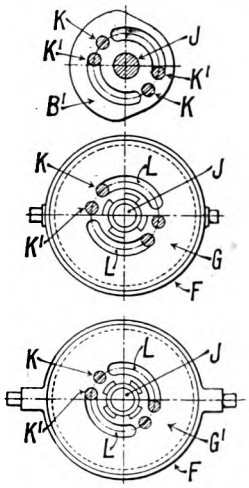


FIG. 3.

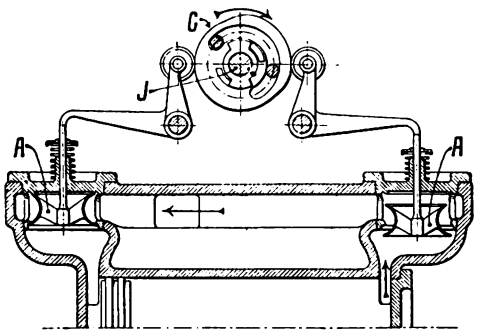


FIG. 2.

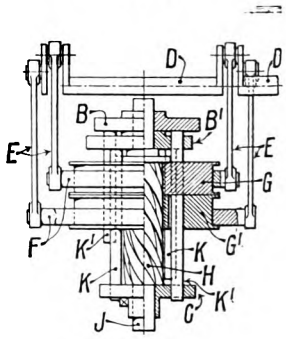


FIG. 4.

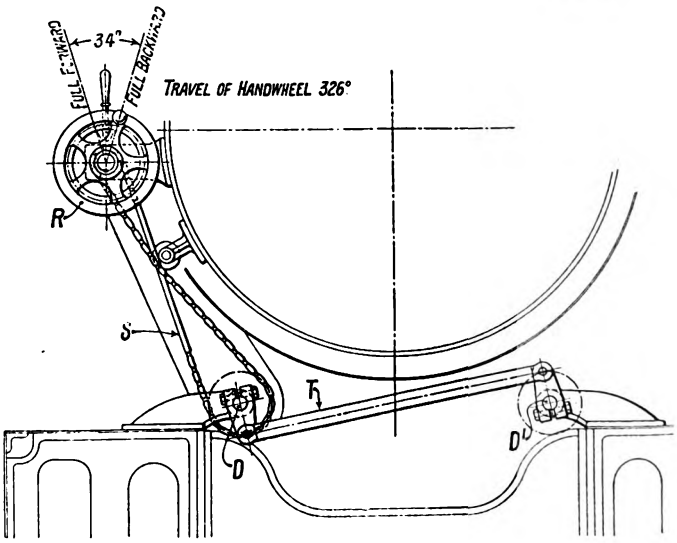


FIG. 6.

Digitized by Google

of the poppet type, are free from surface friction.

It will be seen that with the Caprotti system, by employing separate means for operating the steam and exhaust valves, it is possible to maintain the points of release and compression of the steam in the cylinders constant for any degree of cut-off. Thus the dual advantage is secured of obtaining more work from the expansion of the steam and, at the same time, a considerable reduction in the volume of the steam passages between the valves and the ends of the cylinders. These two features taken together result in a considerable improvement in the efficiency with which the steam is utilised in the cylinders.

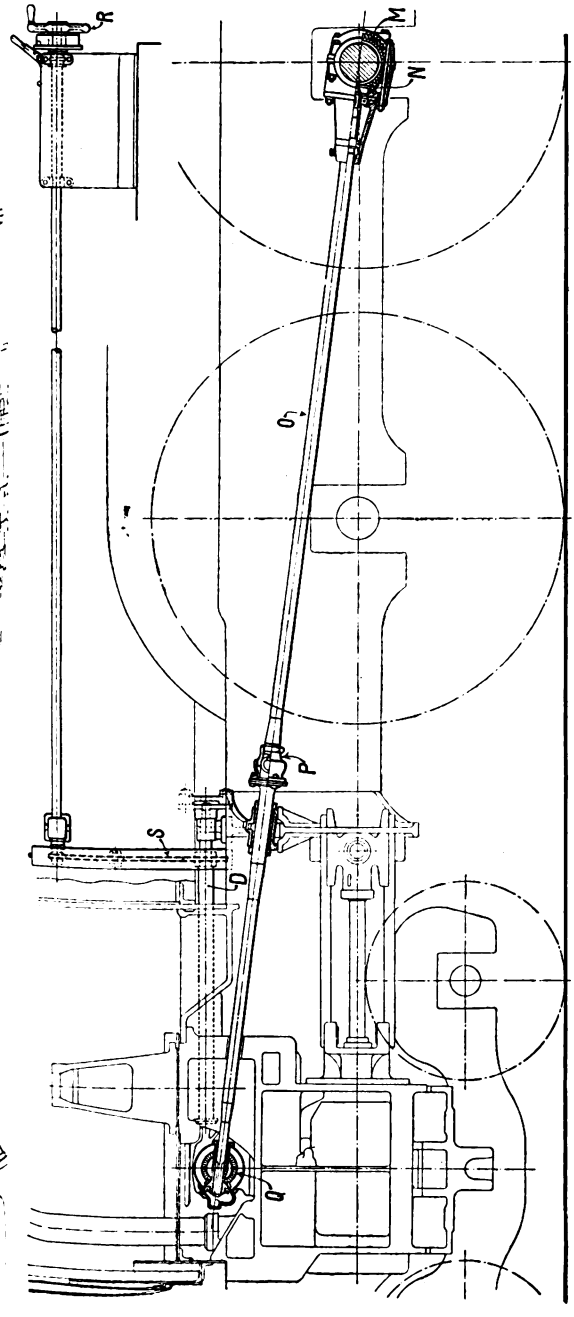


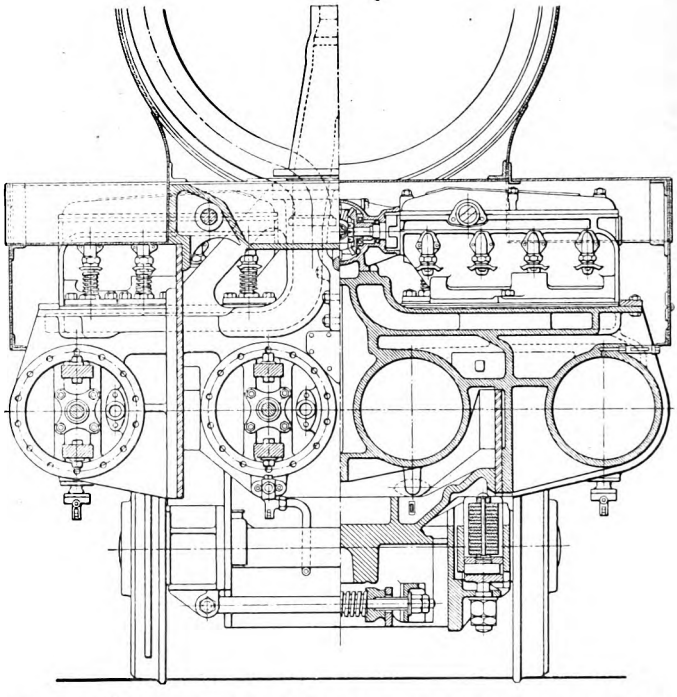
FIG. 5.

A series of tests have recently been conducted on the L.M.S.R. between Euston and Carlisle with a four-cylinder 4-6-0 locomotive of the "Claughton" class, No. 5908 *Alfred Fletcher*, which has been equipped with the Caprotti valve gear. It will be seen from the illustration reproduced, that except for the absence of the Walschaert gear originally fitted to the locomotive, and the presence of the casing above the cylinders for enclosing the valves and valve operating mechanism, the engine, so far as its appearance goes, remains much as before. It has been employed on express passenger trains between Crewe, Carlisle and Euston.

A standard "Claughton" engine, No. 5917, was run in the trials against No. 5908. The coal consumed by No. 5908 during the period January 1 to September 18, 1927, over a distance of 33,543 miles, amounted to 692 tons, which works out at 46·212 lb. per mile. During the same time engine No. 5917 ran 31,970 miles and consumed 832 tons 7 cwt. of coal, equivalent to 58·319 lb. per mile. No. 5908, with the Caprotti gear, thus showed an economy in fuel of 20·76 per cent. over the standard "Claughton."

If the mileage is equalised, the Caprotti engine shows a saving of 181 tons 6 cwt. of coal, for the period of the test, amounting approximately to 241 tons per annum. In addition,

Digitized by Google



CYLINDER CROSS-SECTION, SHOWING DISPOSITION OF VALVES.

the Caprotti-fitted engine showed a saving in cylinder oil over No. 5917 of 50·8 per cent., and in motion oil of 21 per cent. As a direct result of the reduction in the number of motion pin joints, and in the elimination of valve spindle packings, the amount of attention required at the running sheds has been considerably reduced. The inlet steam and exhaust valves fitted to the cylinders are so arranged that when the engine is drifting they act as efficient bye-pass valves, thus eliminating excessive compression and giving a very freerunning engine.

"ROYAL SCOT" CLASS LOCOMOTIVES, L.M.S.R.

6100 *Royal Scot.*
6101 *Royal Scots Grey.*
6102 *Black Watch.*
6103 *Royal Scots Fusilier.*
6104 *Scottish Borderer.*
6105 *Cameron Highlander.*
6106 *Gordon Highlander.*
6107 *Argyll and Sutherland Highlander.*
6108 *Seaforth Highlander.*
6109 *Royal Engineer.*
6110 *Grenadier Guardsman.*
6111 *Royal Fusilier*
6112 *Sherwood Forester.*
6113 *Cameronian.*
6114 *Coldstream Guardsman.*
6115 *Scots Guardsman.*
6116 *Irish Guardsman.*
6117 *Welsh Guardsman.*
6118 *Royal Welch Fusilier.*
6119 *Lancashire Fusilier.*
6120 *Royal Inniskilling Fusilier.*
6121 *H.L.I.*
6122 *Royal Ulster Rifleman.*
6123 *Royal Irish Fusilier.*
6124 *Lancashire Witch.*
6125 *Perseverance.*
6126 *Sanspareil.*
6127 *Novelty.*
6128 *Meteor.*
6129 *Comet.*
6130 *Liverpool.*
6131 *Planet.*
6132 *Phœnix.*
6133 *Vulcan.*
6134 *Atlas.*
6135 *Samson.*
6136 *Goliath.*
6137 *Vesta.*
6138 *Fury.*
6139 *Ajax.*
6140 *Hector.*
6141 *Caledonian.*
6142 *Lion.*
6143 *Mail.*
6144 *Ostrich.*
6145 *Condor.*
6146 *Jenny Lind.*
6147 *Courier.*
6148 *Velocipede.*
6149 *Lady of the Lake.*

Note.—Nos. 6100-6123 are named after famous regiments, and Nos. 6124-6149 after early historic locomotives.

Digitized by Google

British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

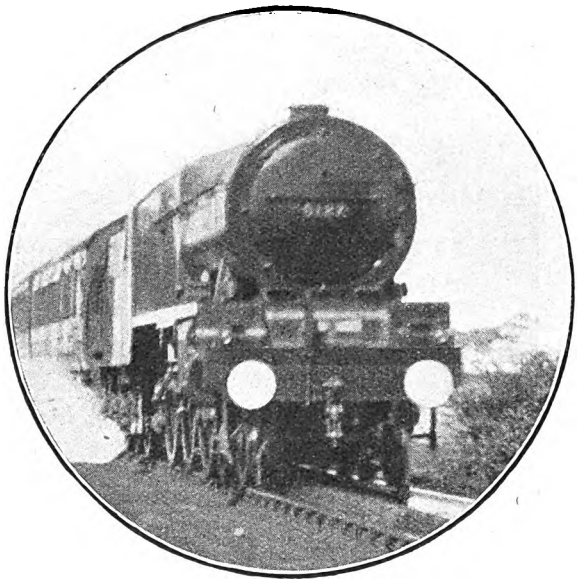


Photo.] [*J. J. Cunningham.*

"ROYAL SCOT" EXPRESS TAKING WATER.
New 4-6-0 No. 6127.

RECENTLY I received from a reader in Paris, to whom I have been indebted on a number of occasions previously for important information relating to French railway practice, some valuable data concerning current railway speeds in France. When time has permitted, I have looked up the corresponding figures in regard to speeds in our own country, and in the current article I present the results of these investigations in tabular form. It will be seen that there are two tables, one showing the start-to-stop runs scheduled in France at speeds of 58 m.p.h. and over, and the other the runs similarly booked in this country. The French table might as well have been described as a list of the fastest runs on the mainland of Europe, as no other country, except Britain, has anything greatly in excess of 50 m.p.h. to show, if anything as fast. Germany, which is in the position of being *proxime accessit*, does not at present rise above a fastest schedule of 52 m.p.h., over one 101-mile stretch on the Berlin-Munich route, but there are indications that the serious inroads of aerial competition will soon compel a drastic acceleration of the long-distance passenger train services, if the best class of passenger traffic is to be retained. In fact, steps are already being taken to draft railway acceleration proposals.

In the British table there are in all 32 runs, and in the French 16. The British figures are, however, swollen by the addition of a number of Great Western slip-coach journeys, which in certain cases mean the inclusion of the same train more than once, even over the same stretch of line. Cutting out these duplications, we have a total of 26 runs; or, again, if we take the number of trains involved in this high-speed running, rather than the number of runs, the total is 23, as against the French 15. Sorted out into respective railways, the Great Western claims 14 of the British trains, the London Midland & Scottish 5, and the London & North Eastern 4. In the French total, however, after we have taken out the two Sud Express runs of the Midi, we find that the whole of the remaining 14 must be credited to the Nord. It is interesting to calculate out the total mileage booked to be covered at 58 m.p.h. and over from start-to-stop, in the two countries. The British aggregate works out at 2,102 miles, of which 1,451 miles belong to the G.W.R., 444 to the L.M.S., and 207 to the L.N.E.R. In France, out of a total of 1,686 miles,

Digitized by Google

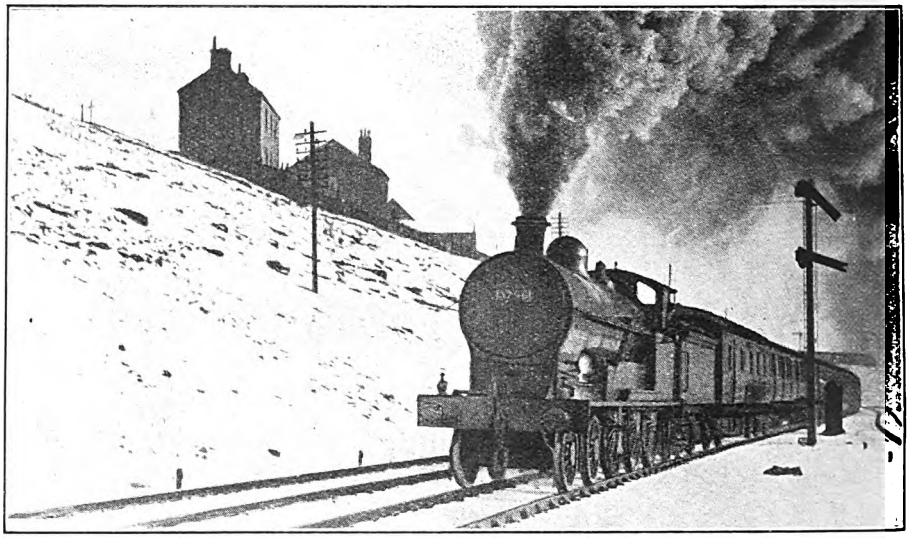


Photo.] [*C. Whitaker.*

LEEDS-LIVERPOOL EXPRESS PASSING LONGWOOD.
L.N.W. 4-6-0 No. 5796.

BRITISH RAILWAY RUNS TIMED AT OVER 58 M.P.H. START-TO-STOP.

Railway.	Train.	From	To	Distance.	Time.	Speed.
				miles.	min.	m.p.h.
G.W.R. ..	* 5.55 p.m. ..	Swindon	Chippenham ..	16·7	16	62·5
,, ..	3.45 p.m. ..	Swindon	Paddington ..	77·3	75	61·8
,, ..	*11.15 a.m. * 1.15 p.m.	Paddington ..	Bath	106·9	105	61·6
L.N.E.R. ..	9.01 p.m. ..	Darlington ..	York	44·1	43	61·5
,, ..	4.30 a.m. ..	Leicester	Nottingham ..	22·6	22	61·5
G.W.R. ..	5.55 p.m. ..	Swindon	Bath	29·6	29	61·2
L.N.E.R. ..	5.49 p.m. ..	Aylesbury ..	Leicester	65·1	65	60·1
,, ..	3.40 a.m. ..	Brackley	Rugby	23·9	24	59·8
,, ..	4.06 a.m. ..	Rugby	Leicester	19·9	20	59·7
G.W.R. ..	*10.30 a.m. 12.00 noon	Paddington ..	Exeter	173·7	175	59·6
,, ..	11.15 a.m. 1.15 p.m.	Paddington ..	Bristol†	118·3	120	59·2
L.M.S. ..	9.21 a.m. .. 4.50 p.m. ..	Willesden Junc. .. Birmingham ..	Birmingham Willesden Junc.	107·5	109	59·2
G.W.R. ..	*10.30 a.m. ..	Paddington ..	Taunton	142·9	145	59·1
,, ..	11.45 a.m. 5.15 p.m.	Bristol ‡	Paddington ..	117·6	120	58·8
,, ..	* 9.42 a.m. ..	High Wycombe ..	Leamington ..	60·8	62	58·8
,, ..	4.30 p.m. ..	Paddington ..	Swindon	77·3	79	58·7
,, ..	* 9.42 a.m. ..	High Wycombe ..	Banbury	41·0	42	58·6
L.N.E.R. ..	*10.30 a.m. * 3.30 p.m.	Paddington ..	Westbury	95·6	¶98	58·5
L.M.S. ..	9.04 a.m. ..	Luton	Kettering	41·0	43	58·3
L.N.E.R. ..	7.31 p.m. ..	Woodford	Aylesbury ..	31·1	32	58·3
L.M.S. ..	2.20 p.m. 5.50 p.m.	Euston	Coventry	94·0	97	58·2
G.W.R. ..	4.10 p.m. ..	Paddington ..	Leamington ..	87·3	90	58·2
,, ..	5.00 p.m. ..	Paddington ..	Kemble	91·0	94	58·1
,, ..	2.18 p.m. ..	Evesham	Worcester	35·8	37	58·1
,, ..	1.10 p.m. ..	Swindon	Paddington ..	77·3	§80	58·0

* By slip carriage. † Via Bath. ‡ Via Badminton. § Working time 78 min.
¶ Booked passing time of 10.30 a.m. 96 min.

Digitized by Google

DAILY RUNS ON FRENCH RAILWAYS AT OVER 58 M.P.H. START-TO-STOP.

Railway.	From	To	Distance.	Time.	Speed.	Train.
			miles.	min.	m.p.h.	
Midi ..	Bordeaux	Dax	91·8	89	61·9	Sud express.
Nord ..	Paris	St. Quentin ..	95·2	94	60·7	Berlin express.
,, ..	Paris	Aulnoye ..	134·0	135	59·5	Amsterdam express.
,, ..	Paris	Abbeville ..	109·1	110	59·4	*Calais boat express.
,, ..	Paris	Arras	119·4	121	59·2	Lille express.
,,	Paris .. .. / Jeumont	Jeumont / Paris	147·8	150	59·1	Nord express.
,, ..	Paris	Etaples	140·8	143	59·1	Boulogne boat express.
,, ..	Paris	Compiegne ..	52·0	53	58·8	—
,, ..	Arras	Longueau ..	41·1	42	58·7	—
,, ..	Etaples	Amiens	59·5	61	58·5	—
,, ..	Aulnoye	St. Quentin ..	38·8	40	58·2	—
,,	Paris .. .. / Calais	Calais / Paris	184·3	190	58·2	"Golden Arrow."
Midi ..	Dax	Bayonne ..	31·0	32	58·0	Sud express.
OTHER LONG AND FAST FRENCH RUNS :—						
Nord ..	Dunkerque ..	Paris	193·9	203	57·3	Tilbury boat express.
Est ..	Bar-sur-Aube ..	Chalons	50·5	53	57·2	—
,, ..	Paris	Chalons	107·0	113	57·0	—
Nord ..	Paris	Dunkerque ..	193·9	205	56·8	Tilbury boat express.
Est ..	Chaumont ..	Troyes	59·4	63	56·7	Basle express.
,, ..	Paris	Troyes	103·3	110	56·4	Basle express.
Orleans ..	Paris	Les Aubrais ..	73·9	80	55·5	Sud express.
Nord	Paris .. .. / Brussels	Brussels / Paris	193·0	210	55·2	"North Star."

* Two runs daily.

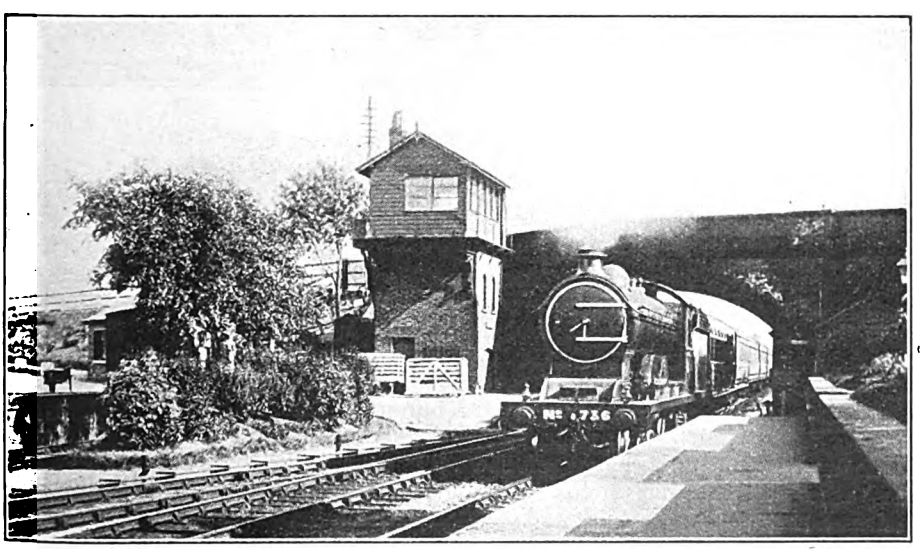


Photo.] [*P. Ransome Wallis.*

DOWN EXPRESS PASSING BENINGBROUGH, L.N.E.R.

Three-cylinder 4-4-2 locomotive No. 736.

Digitized by Google

1,556 miles belong to the Nord, which thus beats the Great Western figure by 105 miles.

If we examine the French running more closely, we find that it possesses even more remarkable features than this table reveals. Certain French journeys which are timed at high speeds over a great part of their length, must be slowed over the sections most remote from Paris, on account of difficulties of grading and curvature; the Exeter-Plymouth timing of the Great Western "Cornish Riviera Limited" is a parallel case in our own country. In France, the Paris-Brussels non-stop "North Star" express, timed at 60 m.p.h. between Paris and St. Quentin, runs on to a road of this kind as soon as it crosses the Belgian frontier. Similarly, the Paris-Dunkerque boat expresses, run in connection with the Tilbury cross-channel service, are allowed only 120 mins. for the 119·4 miles in each direction between Paris and Arras. Yet again, the famous "Golden Arrow," more liberally timed between Boulogne and Calais on account of the 8 miles' ascent at 1 in 125 on either side of Caffiers Summit, are only allowed 156 min. on the outward and 157 min. on the inward journey over the 156½ miles between Paris and the Outreau Junction at Boulogne.

Close examination of working times on the Nord reveals the fact that six expresses on the North route, four on the Calais route and two on the Lille route are timed for distances of over 90 miles at average speeds of 60 m.p.h. or more throughout. So far as I can trace, no other railway in the world can show a comparable figure. The only Great Western expresses coming within this category are the two 175-min. Exeter expresses, so timed from Southall to Exeter; the four Bristol two-hour trains, on the down journey to Bath and on the up journey inwards from Badminton; and the 3·55 p.m. down South Wales express, required to run at this speed between Southall and Badminton, when the Badminton conditional stop is made.

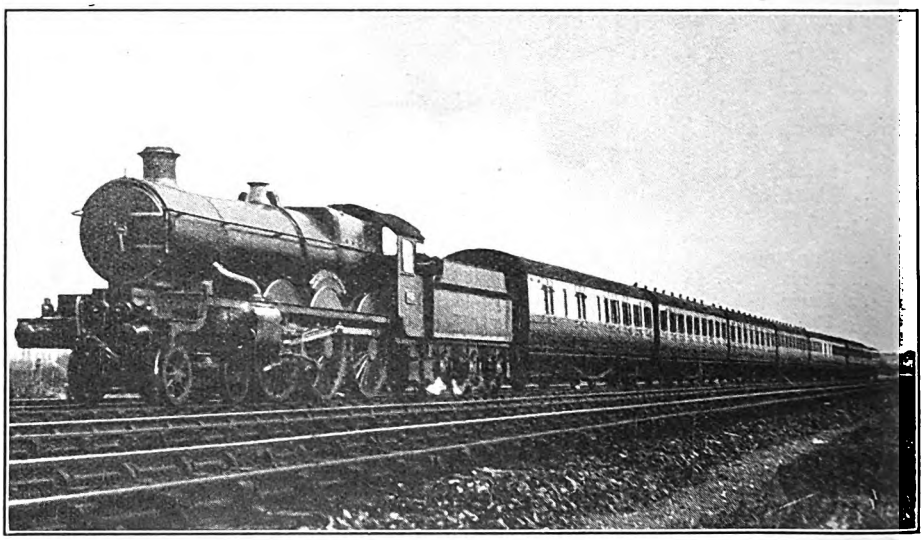


Photo.] [*M. W. Earley.*

DOWN GREAT WESTERN RAILWAY EXPRESS.
Four-cylinder 4-6-0 No. 4079, *Pendennis Castle.*

It is not as though the French records were achieved with light trains. Much concerning the "Golden Arrow" has appeared in these columns, but it is not inappropriate to remind readers that the normal formation, consisting of 10 77-ft. Pullman cars and a bogie brake, weighs 500 tons, which has to be worked over Caffiers, and then through at 60 m.p.h. from Boulogne to Paris, by an unassisted locomotive, no larger nor heavier than one of the L.N.E.R. "Super-Pacifics," and fired with briquettes. The Calais boat expresses carrying ordinary passengers

Digitized by Google

frequently load, during the season, to over 500 tons and occasionally to 600 tons, despite their 59·4-m.p.h. booking from Paris to Abbeville. Against this the Great Western down "Limited," even though it may take a tare load of 500 tons out of Paddington, only carries this maximum figure for just over one-half of the Paddington-Exeter high-speed stretch, dropping off substantial parts of its tail at both Westbury and Taunton, and thereby lightening the load. The down "Torbay Limited" does not attain to a 500-ton load. Not a single one of the other runs booked in Great Britain at over 58 m.p.h. reaches anything like such load figures as these, in the normal course of things.

At the bottom of the French table there appear a small number of other notable French runs, but this is not a complete list. A certain amount of correspondence has figured in the "Why and Wherefore" columns of recent months in regard to the actual distance between Paris and Dunkerque. This matter has now been referred to Monsieur Javary, the Directeur de l'Exploitation of the Nord, who has confirmed the fact that the distance between these points is 312 km., and that the run in question, being longer than the 311 km. between Paris and Brussels, takes pride of place as the longest non-stop run made on the mainland of Europe.

My French friend added to his letter some details of great interest in regard to current locomotive running in France. "Whereas up to 1926," he wrote, "really fast running was only found on the Nord and the Est, it is now being extended to the generality of French lines. Recent tests show that, with loads of from 400 to 500 tons, speeds of 74 m.p.h. are maintained on level track by both the P.L.M. and Orleans Railways, when occasion demands. I recently noted a time of 66 min. 50 sec. over the mainly uphill stretch of 69·6 miles from St. Pierre-des-Corps to Les Aubrais with a 380-ton train. Bayonne, 482·6 miles from Paris, is reached in 9 hr. 32 min., at an overall speed of 50·6 m.p.h., and Belfort in 8 hr. 38 min. from Calais, 432·6 miles, at 50·1 m.p.h. Even on the Etat lines, which have not been exactly noted for their speed achievements in years gone by, Rennes is now reached in the unheard-of time of 4 hr. 53 min., representing an inclusive average of 47·8 m.p.h., and the 102-min. schedule over the 86·7 miles from Paris to Rouen includes an allowance of 10 min. for tunnel reconstruction *en route*. In regard to locomotive developments, I may mention that one of the new 4-8-2

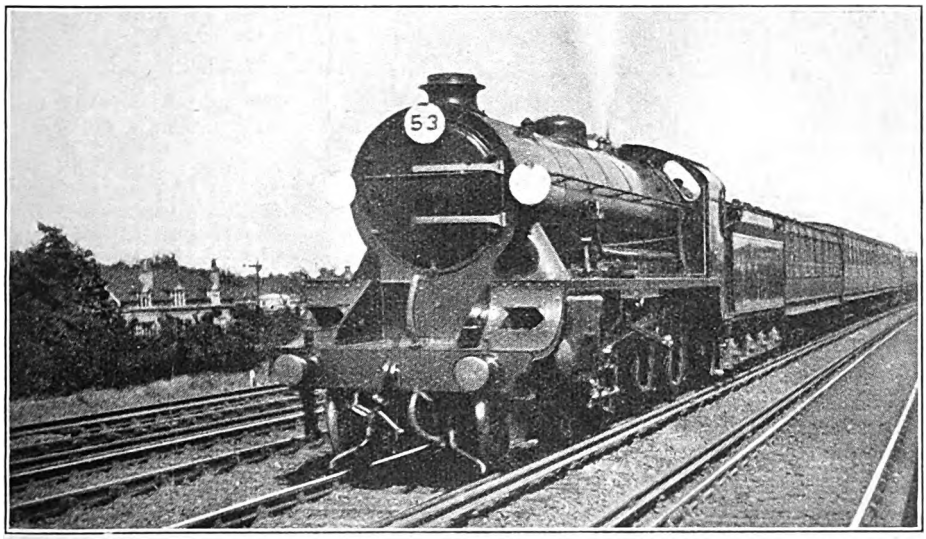


Photo.] [*W. H. Silcock.*

11.30 A.M. SUNDAY BOURNEMOUTH-WATERLOO EXPRESS, S.R.
"King Arthur" class 4-6-0 No. 773, *Sir Lavaine.*

Digitized by Google

four-cylinder compound heavy express locomotives of the P.L.M., fitted with the A.C.F.I. feed-water heater, has worked a 646-ton train over the uphill stretch from Paris to Blaisy-Bas in the same time as the compound "Pacific" with 488 tons in the trials of 1913, climbing the 1 in 125 with this load at 46·6 m.p.h. Tests are now contemplated with a load of 850 tons." All this information is of very great series of these, made over the Great Western Railway London-Bristol route and the North Eastern and Great Central sections of the London and North Eastern Railway. The Swindon-Chippenham slip booking at 62·5 m.p.h. is more or less a "freak" timing, and, though I have not travelled on the train concerned, I should imagine that time is customarily lost between Swindon and Chippenham, and

G.W.R. SWINDON—PADDINGTON.

Distance.	Engine, 4-6-0, No.	Schedule.	4081		2998		5010		6000	6001	
	,, Name		*Warwick Castle*		*Ernest Cunard*		*Restormel Castle*		*King George V*	*King Edward VII*	
	Load (axles)		30		34		32		40	40	
	,, (tons tare)		204		240		240		316	349	
	,, (,, full)		220		255		255		330	370	
Miles.		min.	m. s.	m. p.h.	m. s.	m. p.h	m. s.	m. p.h.	m. s.	m. s.	m. p.h.
0·0	Swindon	0	0 00	—	0 00	—	0 00	—	0 00	76 10	—
5·7	Shrivenham	—	7 01	72½	7 27	—	7 42	67	9 05	70 02	—
10·8	Uffington	—	11 15	70½	11 47	76½	12 15	67	13 50	65 15	62
13·4	Challow	—	13 24	75	13 55	74	14 35	—	16 12	62 47	—
16·9	Wantage Road	—	16 11	72½	16 41	77½	17 42	69	19 12	59 30	64
20·8	Steventon	20½	19 10	77½	19 45	72½	21 07	—	22 31	55 52	—
24·2	Didcot	24	21 44	80½	22 23	77½	24 02	—	25 21	52 47	67
28·8	Cholsey	—	25 21	75	26 14	—	28 07	69	29 23	48 37	—
32·6	Goring	—	28 14	77½	29 28	68	31 22	—	32 31	45 25	68
35·8	Pangbourne	—	30 48	72½	32 17	70½	34 08	70	35 13	42 38	—
38·7	Tilehurst	—	33 05	76½	34 43	69	36 32	—	37 38	40 07	68
41·3	Reading	40	p.w.s. 35 27	—	36 53	74	38 45	74	39 54	37 50	66
46·3	Twyford	45	p.w.s. 41 45	26 —	41 05	68	42 53	—	44 17	33 23	60
53·1	Maidenhead	50½	47 43	—	sigs. 46 43	60 —	48 12	—	50 03	26 20	—
58·8	Slough	55½	52 41	70½	51 53	72½	52 45	74	54 48	p.w.r. 19 45	30 71½
64·1	West Drayton	—	57 13	70½	56 21	67	56 55	75	59 13	15 18	67
68·2	Southall	64	60 50	69	59 59	69	60 20	74	sigs. 64 48	11 30	—
71·6	Ealing	—	63 41	—	62 48	—	63 00	74	68 37	8 10	—
73·0	Acton	—	64 53	71½	sigs.	72½	64 10	—	69 57	6 35	—
76·0	Westbourne Park	—	sigs.	—	p.w.s.	—	sigs. 69 35	45 —	sigs. 74 22	2 45	—
77·3	Paddington	75	71 49	—	70 40	—	70 00	—	77 38	0 00	—
77·3	Net times (min.)	—	67½	—	68¼	—	69½	—	72½	73½	—

moment, and shows clearly that the railways of Great Britain will have to bestir themselves if they are to maintain any supremacy in railway speeds over those of their near European neighbour.

It has struck me that the most suitable corollary to the foregoing notes on speed would be a few logs of running on certain of the 60-m.p.h. scheduled runs of Great Britain, and I have therefore tabulated a regained from there on to Bath. We will begin, therefore, with the better-known Swindon to Paddington 75-min. journey of the 3.45 p.m. up express, which, from the timings tabulated, appears to allow of substantial cuts on booked time, delays notwithstanding. All these runs were timed by correspondents; the first three were made on the train to which I have referred, and the remaining two consist

Digitized by Google

of one in each direction on the remarkable Swindon Works excursion trips which the Great Western Company has been running for some months past. In the latter case the schedule is 80 min., but is frequently improved on, and the load exceeds that of the 75-min. booking.

I have tabulated with each journey the speeds noted *en route*, except in the case of the up excursion trip, where the correspondent concerned shows throughout rather higher speeds than his point-to-point times warrant. In the first run the "Castle" ran finely with a light train, averaging 75·7 m.p.h. throughout over the 33 miles from Shrivenham to Tilehurst, 70 from the dead start to the same point, and just crossing the "eighty" line at Didcot. The permanent-way check through Reading was long and severe; steam was shut off at the 37th mile-post, and brakes were applied at 36½, the actual reduction being to 26 m.p.h.; despite this check and further signal and permanent-way delays between Acton and Paddington, a late start of 1 minute was converted into an early arrival by just over 2 min. The net time of 67½ min.—7½ min. under schedule—represents an average start-to-stop speed of 68·7 m.p.h. In the next column the 25-year-old 2-cylinder engine, *Ernest Cunard*—"the second oldest 4-6-0 on the line," as my correspondent remarks—put up a spirited performance with a 255-ton train. There were curious fluctuations in the speed, to which the table bears witness, especially as there was no wind to account for reduced speed over exposed sections of the line; but for all that an average rate of 71·4 m.p.h. was kept up for 65·9 miles from Shrivenham to Ealing, despite the very slight check (from 75 to 60 m.p.h.) at Maidenhead. Further checks were experienced inwards from Ealing, but 4¼ min. were gained from Swindon, and the net time of 68¼ min. represents a start-to-stop average of 67·9 m.p.h. *Restormel Castle* took things more steadily on the early stages of her run, but awoke to a tremendous effort on the London side of Reading, keeping up an average rate of almost exactly 75 m.p.h. over the 30·3 miles from Reading to Ealing. *Warwick's* start from Swindon to

L.N.E.R. DARLINGTON—YORK.

Engine No.	Distance.	*2569		*2579		†706 and ‡2197		*2571		‡717		Distance.
,, Name		*Gladiateur*		*Dick Turpin*		—		*Sunstar*		—		
Load (axles)		35		52		44		46		34		
,, (tons tare)		252		379		336		344		212		
,, (,, full)		265		395		355		365		225		
	Miles.	m. s.	m. p.h.	m. s.	m. p.h.	m. s.	m. p.h.	m. s.	m. p.h.	m. s.	m. p.h.	Miles.
Darlington	0·0	0 00	§	0 00	§	0 00	§	47 45	§	45 45	§	44·1
Croft Spa	2·6	4 45	55	4 45	54	4 45	55½	44 10	74	42 00	68	41·5
Eryholme	5·2	7 40	55	7 50	50½	7 25	57½	41 55	66	39 40	61½	38·9
Cowton	6·9	9 25	62½	9 40	—	9 10	—	40 20	67	38 00	—	37·2
Danby Wiske	10·4	12 35	68	13 05	64½	12 15	69	37 15	71½	34 45	68	33·7
Northallerton	14·1	16 10	64½	16 45	61½	15 45	65	33 50	64½	31 10	62½	30·0
Otterington	17·5	19 15	70½	19 55	69	18 45	71½	30 40	66	27 55	—	26·6
Thirsk	21·9	22 55	72½	23 35	72½	22 25	74	26 40	67	23 45	64½	22·2
Sessay	26·1	26 35	69	27 15	69	26 10	70½	22 45	—	19 50	65	18·0
Pilmoor	28·0	28 20	70½	29 00	70½	27 50	71½	20 50	61½	18 00	66	16·1
Raskelf	30·7	30 40	71½	31 15	72½	30 10	72½	18 10	61½	15 30	68	13·4
Alne	32·9	32 30	72½	33 05	74	32 00	70½	15 55	62½	13 35	71½	11·2
Tollerton	34·4	33 45	71½	34 20	71½	33 20	—	14 35	—	12 15	66	9·7
Beningbrough	38·6	37 20	71½	37 55	71½	37 00	67	10 05	—	8 15	60	5·5
Poppleton Jc.	42·5	40 40	—	41 15	—	40 40	—	5 00	—	3 40	—	1·6
0¼ mile-post	43·8	—	—	42 50	sigs.	—	—	—	—	—	—	—
York	44·1	43 45	—	46 05	—	44 45	—	0 00	—	0 00	—	0·0

* Gresley 4-6-2. † Two-cylinder N.E. 4-4-2, ‡ Three-cylinder N.E. 4-4-2, Class "Z." Class "V."

§ Actual speeds at or near these stations, by chronograph.

Digitized by Google

Tilehurst, added to *Restormel's* finish from Tilehurst to Acton, gives a total time of 60 min. 43 sec. for the 73 miles from the Swindon start to passing Acton, equivalent to passing Westbourne Park, with a clear road, in 63¾ min., and reaching Paddington in a little over 66 min.

with 330 tons was only ¾-min. in excess of that on the two preceding trips. The down journey in the last column, of *King Edward VII* hauling a heavier train of 370 tons' weight, was a finer performance, however, as it was made against the very gradually rising tendency of the road. The

G.W.R. PADDINGTON—BATH.

Distance.	Engine, 4-6-0 No. / " Name.	Schedule.	2929 *Saint Stephen.*		5002 *Ludlow Castle.*		5007 *Rougemont Castle.*	
	Load to Didcot (tons). / Do. Didcot—Bath (tons).		E 281 / E 281	300 F / 300 F	E 313 / E 260	330 F / 275 F	E 370 / E 302	400 F / 325 F
Miles.		min.	m. s.	m.p.h.	m. s.	m.p.h.	m. s.	m.p.h.
0·0	Paddington	0	0 00	¶	0 00	¶	0 00	¶
1·3	Westbourne Park ..	—	2 49	—	3 10	—	3 20	—
			p.w.s.	30	p.w.s.	30		
4·3	Acton	—	7 36	—	7 50	—	7 35	—
5·7	Ealing	—	9 13	—	9 30	55½	9 20	51
9·1	Southall	11	12 35	—	13 00	59	13 00	58½
13·2	West Drayton	—	16 16	—	17 05	65	17 10	65
18·5	Slough	20	20 37	74	21 55	68	21 50	69
24·2	Maidenhead	25½	25 29	70½	27 10	65	27 00	66
31·0	Twyford	31½	31 11	70½	33 30	64	33 10	66
			p.w.s.	25	p.w.s.	15		
36·0	Reading	37	36 00	—	39 55	—	37 45	64
38·6	Tilehurst	—	39 29	—	43 15	54	40 25	61½
41·5	Pangbourne	—	42 19	—	46 10	60	43 10	64
44·7	Goring	—	45 15	—	49 15	65	46 10	—
48·5	Cholsey	—	48 35	—	52 45	66	49 35	66
53·1	Didcot	53½	52 45	67	57 15	60	53 55	64
56·5	Steventon..	57	55 46	65	60 30	65	57 05	65
60·4	Wantage Road	—	59 12	68	64 05	65	60 45	64
			sigs.	56				
63·9	Challow	—	62 32	—	67 20	64½	64 00	64
66·5	Uffington	—	65 02	65	69 50	64	66 30	64
			sig. stop	0				
71·6	Shrivenham	—	73 27	—	74 35	66	71 10	64
77·3	Swindon	77	79 26	—	79 55	65	76 40	†55
82·9	Wootton Bassett.. ..	—	84 40	—	84 50	70½	82 10	70½
87·7	Dauntsey	—	88 44	77½	88 50	80½	86 05	80½
94·0	Chippenham	93	93 55	70½	94 10	66	91 40	60
98·3	Corsham	—	97 56	60	98 10	63	96 15	55½
101·9	Box	—	101 07	70½	101 20	70½	99 35	76½
104·6	Bathampton	—	103 36	—	103 55	—	101 55	70½
106·9	Bath (pass.)	—	106 09	35	*106 30	—	104 40	25
106·9	Bath (slip arr.)	105	*106 30	—	106 50	—	*105 00	—
106·9	Net times (min.)	105	98½	—	103½	—	105	—

* Estimated times. ¶ Speeds at or near stations named, by chronograph. † Eased through Swindon Yard. E Empty. F Full.

On the up excursion journey the driver of *King George V* took things very easily to Uffington, but from there to West Drayton, where the first check was experienced, the average rate was exactly 70 m.p.h. for 53·3 miles—excursion travelling extraordinary!—and the time

start from Paddington was brilliant indeed, with a time of only 19¾ min. to Slough; Reading would have been passed in but little over 35 min., but for the permanent-way check at Burnham Beeches. "Even time" had been bettered at Didcot, and speed was still maintained above the sixty

Digitized by Google

line up the definite rise from Didcot to Shrivenham, so that the 77·3 miles to Swindon were accomplished in 76 min. 10 sec., or 73½ min. net.

Following this I have a table of three runs on the 105-min. down Bath schedule. The first, timed by a correspondent, was made on the 1·15 p.m. train, and was a very fine effort by a 2-cylinder 4-6-0, *Saint Stephen*, whose driver, undaunted by the most vexatious delays, determined to reach Bristol on time, as ultimately he did. There was first of all an average rate of 72·1 m.p.h. from Hayes to Twyford, brought to an end by a permanent-way check just before Reading, to 25 m.p.h. Speed was being maintained at upwards of 65 m.p.h. when there came a check to 56 between Wantage Road and Challow. But the crowning misfortune was a dead stand for adverse signals at Knighton Crossing box, which, with Shrivenham, in my experience, shares a bad reputation for these undesirable attentions to down expresses. The time for the 69 miles from Paddington to Knighton, start-to-stop, was 67 min. 46 sec., or 63½ min. net, showing an average of 65·8 m.p.h. The stop lasted 58 seconds, and *Saint Stephen* then got away again with a will, succeeding in making a passage through Bath only just over a minute behind time. With a maximum rate of 71½ m.p.h. at Keynsham, no signal checks before Bristol—"positively the first time I have ever had a clear road into Temple Meads," my correspondent notes—the train came to a stand in 119 min. 29 sec. from Paddington, the engine having achieved a net time of not more than 111½ min. for the 118·3 miles.

My two Bath runs were both made on the 11.15 a.m. down, which, with its substantial Didcot slip (of extraordinary comprehensiveness in its connections, as a recent "Pertinent Paragraph" bore witness) at times takes a heavy load for the two-hour schedule. The first of my two trips, behind *Ludlow Castle*, was unenterprising as far as Didcot, but matters improved after we had been relieved of the Didcot slip portion. Speed remained well above the "sixty" line up to Shrivenham, and we then touched 80 on Dauntsey Bank, but were nevertheless 2 min. down at Bath, where I alighted. *Rougemont Castle*, with 400 tons out of Paddington, and 325 tons beyond Didcot, made a better effort, and we were fortunate in having no checks as far as St. Anne's Park. So we were through Bath in 104 min. 40 sec., and St. Anne's Park, 116·7 miles, in 115¼ min.; given a clear road we should

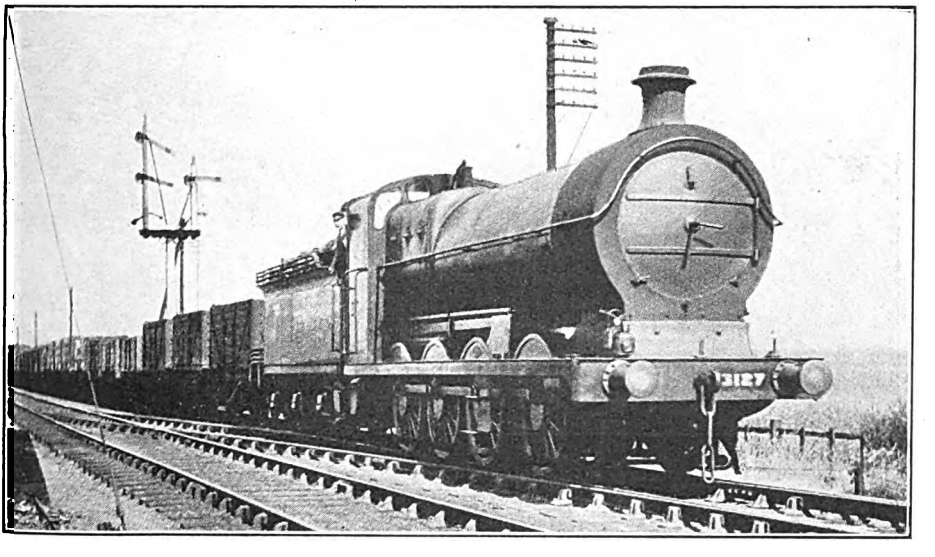


Photo.] L.N.E.R. GOODS TRAIN. [*C. J. L. Romanes.*

Hull and Barnsley type 0-8-0 No. 3127.

Digitized by Google

have made Temple Meads in 118 min., but our actual time was 118 min. 50 sec. But neither of the "Castle" performances was equal to that of the veteran "Saint."

We now move northwards. A correspondent from the North-Eastern counties wrote a really pathetic letter recently, to the effect that those whose affections still centred in the old North Eastern system were "starved" for information as to what the locomotives were doing in that area of the L.N.E. system. To which I can only reply that much of the locomotive running in that part of the world is so desperately dull that, with the memory of past North Eastern locomotive achievements still fresh, it does not seem to me to merit description. Why should the 5.30 p.m. express from King's Cross to Newcastle, not bound by any East Coast and West Coast Anglo-Scottish agreements, need 106 minutes to-day to run with a "Pacific" and ten coaches from York to Newcastle, when, in earlier years, it was booked to run with a non-superheated 4-4-0 of class "R" (weighing 55 tons against 92½), hauling six or seven coaches, over the same distance in 94 minutes? The competitive 8.55 a.m. from Leeds to Glasgow, also uncontrolled by agreements, once ran daily with "R" class engines from York to Newcastle in 82 minutes and from Newcastle to Edinburgh in 138 minutes, as compared with present timings of 92 and 145 minutes.

Over the dead level 44 miles between York and Darlington, apart from one 43-min. booking, there is nothing faster than 48 min., despite the colossal engines in use, and many of the times exceed 50 min. And even on the latter time is sometimes lost, as when recently the "Pacific" engine *Galopin*, with a 400-ton train on the 1.15 p.m. from King's Cross, lost 2¼ min. by a permanent-way check at Pilmoor, and required 53 min. 50 sec. to make the York-Darlington run. The driver then proceeded to gain 7¼ min. on the extraordinarily liberal allowance of 53 min. for the 36 miles from Darlington to Newcastle (despite the fact that this important express is still 10 min. in its timing over the "agreed" 8¼ hours from London to Edinburgh), making the run in 45¾ min., notwithstanding a signal check outside Durham and the usual crawl over Durham Viaduct. If the liberality of time referred to has relation to possible pitfall speed restrictions, I can only remark that our average rate through the Chester-le-Street and Birtley

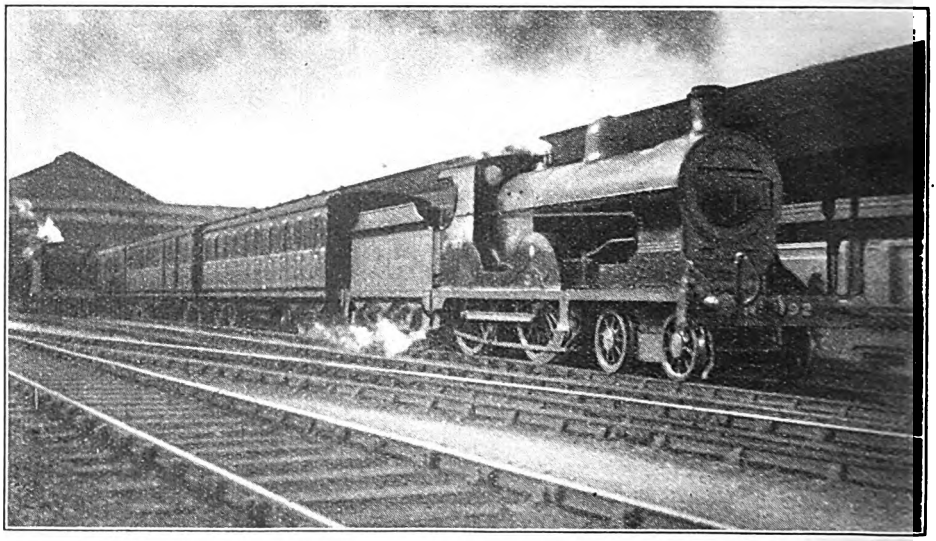


Photo.] [*A. H. K. Roberts.*

DUBLIN-BELFAST EXPRESS AT AMIENS STREET, DUBLIN.

Great Northern 4-4-0 No. 192.

Digitized by Google

nining area on this occasion was well over 70 m.p.h. for some miles.

But enough of such dismal reflections; one does certainly note some enterprising travelling at times. A few such journeys are tabled herewith. The first of them is the only one I have had for some time on the 43-min. "flyer," and we failed by 15 secs. to keep exact time, although completing the run in a shade under "even time." It was the leisurely start to Northallerton, so often made, that was chiefly responsible for the loss; after that we ran almost uninterruptedly at over 70 m.p.h. until shutting off steam before Poppleton Junction. The 23·5 miles from Otterington to Skelton Bridge were run in 20 min. 0 sec., at an average rate of exactly 0 m.p.h. A considerably finer run was that made by *Dick Turpin*, with a train of all but 400 tons, on the 8.55 a.m. from Darlington to York. Falling 40 sec. behind *Gladiateur* from Croft Spa down to Otterington, *Dick Turpin*, with 130 tons more of train-weight, tied in time—and, in fact, slightly improved on the previous run—from there to Poppleton Junction, and made the start-to-stop run of 43·8 miles to a signal stop at York North End in 42 min. 50 sec., equivalent to a time of 44¼ min. from Darlington to York. The next run was made by a couple of "Atlantics" on the same express, and with so prodigal an allowance of locomotive power requires no comment.

In the opposite direction there is first a trip on the 49-min. 9.14 p.m. from York to Darlington, which is the 5.30 p.m. from King's Cross, to which reference has just been made. *Sunstar* made the start out of York which is so thoroughly typical at the present time, and it was not until Thirsk that the engine was opened out. Then we maintained well over 60 m.p.h. up the rising grades to Northallerton, and again up to Eryholme, as a result of which time was improved on by 1¼ min. The "Atlantic" run was on the 2.3 p.m. 48-min. train, and in its early stages was quite reminiscent of old days, with a fine start to Alne, where we were doing 71½ m.p.h. Then the engine was eased, but even so we reached Darlington in 45¾ min.—2¼ min. under schedule. The York-Thirsk time of this run, added to the Thirsk-Darlington time of the run preceding, gives a total of 44¾ min.—still ¾-min. in excess of the one-time 44-min. allowance.

On the Great Central section the uncomfortably early departure of the morning newspaper express is little encouragement to the acquisition of data concerning the performance of its locomotives, and this leaves only the Aylesbury-Leicester run

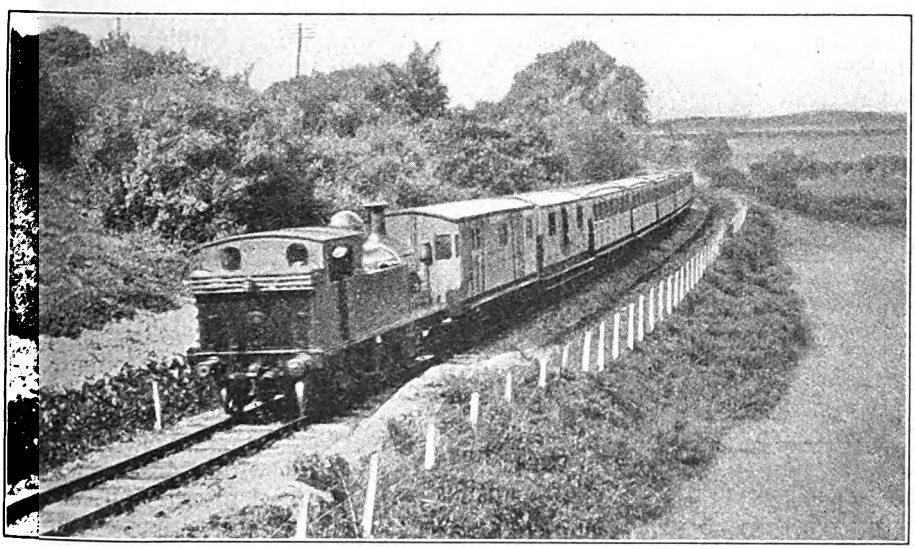


Photo.] VENTNOR-RYDE TRAIN NEAR SHANKLIN. [W. G. Boyden.
S.R. 0-4-4T No. W. 23 (late L.S.W.R. No. 188).

Digitized by Google

of the 5 p.m. down among the 60-m.p.h. start-to-stop schedules. I have had but one recent run on this express, of which the section concerned is tabulated. Owing to a permanent-way slowing for a slip on the down side between Helmdon and Culworth which has been operative for some time

L.N.E.R. AYLESBURY—LEICESTER.

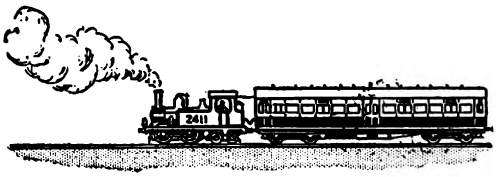
Engine: 4-4-0 No. 5502, *Zeebrugge*.
Load: 26 axles; 210 tons tare, 220 tons full.

Distance.		Sched.	Actual.	Speeds.
miles.		min.	m. s.	m.p.h.
0·0	Aylesbury ..	0	0 00	—
6·1	Quainton Rd. Junction ..	8	7 50	—
8·8	Grendon Jc.	—	10 30	68
10·8	Calvert ..	—	12 25	59
			—	62½
16·5	Finmere ..	—	18 00	55½
				67
21·3	Brackley ..	—	22 55	49½
24·5	Helmdon ..	—	26 55	—
			p.w.s.	30
28·1	Culworth ..	—	31 15	—
31·1	Woodford ..	33	34 25	—
33·5	Charwelton ..	—	37 05	—
40·5	Braunston ..	—	43 10	82
45·2	Rugby ..	—	47 15	62½
			—	70½
52·0	Lutterworth	—	54 05	51
55·9	Ashby ..	—	58 05	—
60·4	Whetstone ..	—	61 35	83½
65·1	Leicester ..	65	66 00	—

past, we did not quite keep time, but I should judge our net time for the 65·1 miles to have been about 64½ min. The descent from Charwelton to Leicester was enlivened by two very high maximum speeds—of 82 an hour at Braunston and 83½ at Whetstone—but was somewhat marred, on the other hand, by the low minima of 62½ m.p.h. at Rugby and 51 before Lutterworth. A little more energy up these modest ascents would have brought us into Leicester on time.

Another correspondent complained recently about the dearth of Great Central matter in these articles. The explanation simply is that nothing fresh is occurring on that section—there have been no changes in either engines, loads or timings for a considerable while past, and there is nothing to be recorded (though I have notes of numerous Great Central runs as yet unpublished) that has not been set on record many times previously. One thing for which I will promise immediate publication is my first punctual run on the 6.20 p.m. down express. Still is this hard turn entrusted to nothing more powerful than Great Central "Atlantics," and late arrivals at Leicester of 9½, 5, 4, 12 and 5½ min. on my last five consecutive journeys call loudly for some amendment of working.

Letters have been received during the past month from "Exhaust," H. J. J. Griffith, F. R. Hebron, E. Joslin, Alec Low, C. E. W. Neat, O. S. Nock, C. R. Prescott, and others, to whom personal acknowledgments have been sent. By way of "stop press" information concerning the G.C. section of the L.N.E.R., I may say that I have just timed a fine run on the 6.20 p.m. down express, on which we got within 45 seconds of the schedule time of arrival at Leicester—so far as I am concerned, the "nearest ever." I have also had a much better trip with a "Royal Scot" between Euston and Crewe than those of my own timing appearing in last month's issue. Both these runs shall figure in my next article.



Digitized by Google

THE RAILWAY PORTRAIT GALLERY.

MR. FRANK PICK,

Managing Director,

Associated "Underground" Companies.

MR. FRANK PICK, who has been appointed Managing Director to the associated "Underground" Companies, has held the position of Assistant Managing Director since 1921. For a time he was associated in this capacity with Mr. (now Sir) H. E. Blain, but since the latter left the "Underground" to enter the political field, Mr. Pick has held the position alone. He was for some years at the head of the Publicity Department of the London Underground Railways. In this sphere he achieved such success that he was subsequently appointed Commercial Manager. During the war Mr. Pick was attached to the Controller of Mines Department, and rendered much good service. When, in 1921, a reorganisation of the railway and associated staff took place, Mr. Pick became an Assistant Managing Director, as above mentioned. Mr. Pick is a member of the London and Home Counties Traffic Advisory Committee, and has been associated with a number of other committees, &c., dealing with various phases of public service transport from time to time. Mr. Pick was born at Spalding, qualified as a Solicitor in 1902, and become LL.B. (London) with first-class honours in 1903. He entered N.E.R. service in 1902, coming to London in 1906 with Sir George Gibb.

Digitized by Google

RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book" (5s. net) should be consulted. The thirtieth Annual Edition* (1927) *of this standard railway reference work is now published. All previous Editions are out of print.*

Grove Road Station, Hammersmith.

Prior to electrification Metropolitan and Great Western trains working Hammersmith and City Railway services, but not terminating at Hammersmith, continued on the viaduct mentioned by you to Grove Road station, Hammersmith, beyond which they travelled over the Southern Railway line to Turnham Green and *via* Gunnersbury to Richmond. This route was also used by L.S.W.R. trains from Waterloo *via* Addison Road and thence through Shepherd's Bush to join the same line. These routes are now disused and beside the derelict viaduct at Hammersmith the tracks can be noted alongside those used by Metropolitan District trains through Ravenscourt Park, Stamford Brook and Turnham Green. These routes were abandoned partly because of the changes introduced by electrification, but more particularly, we understand, because, with the growth of road transport in the district, conditions rendered it undesirable to reintroduce the services concerned after their withdrawal during the war.

[Reply to J. L. MAWHOOD.]

Church Time Trains.

We believe that some of the Acts of Parliament for early railways included provisions prohibiting the running of trains during the morning church interval on Sunday, and in some cases throughout the whole of that day, but in other instances the matter was covered by some agreement, on the basis of which the consent of local authorities or of local land owners was given to the construction of the railway in question. In the main, however, we believe that the observance of the church time interval, until comparatively recently, was largely in deference to local opinion, and it has only been during the past 20 or 30 years that this period has been gradually encroached upon and train services arranged irrespective thereof. It is impossible to give an actual date, in that the change occurred first by gradual encroachment upon the church interval, thus leading to its non-observance.

[Reply to H. PELTIER.]

Forest of Dean Railway.

The Forest of Dean and Forest of Deal Central Railways have received incidental reference in early volumes but all the issues concerned are now out of print. A certain amount of information has been given in historic articles and books dealing with the Great Western Railway, and, on referring to the recently published work by Mr. E. T. MacDermot, we find that the Forest of Dean line was opened in 1854 for coal traffic as a broad-gauge line, though as early as 1845 the South Wales Railway

Digitized by Google

had agreed to buy up the original tramway there, but the purchase was not completed until 1850. The conversion to a railway involved a number of engineering works. The Forest of Dean Central Railway was incorporated in 1856 and was built to the broad gauge, though not opened, so far as we can gather, for some years afterwards.

[Reply to "CINDERFORDIAN"]

An Unusual Locomotive.

Mr. H. Dixon-Hewitt suggests that the engine noted on the Great Eastern section of the L.N.E.R. was possibly an ex-G.C.R. locomotive. He does not state that he has seen any 4-4-0's in service there, but mentions that several 0-6-0 outside crank locomotives have been running on the G.E. Section for some time past. Among those he has seen on the Norfolk lines are Nos. 5552-3-7. He refers also to the use of G.N. 2-6-0's between Cambridge and Norwich. Old G.E. 0-6-0 No. 07038, the subject of recent inquiries, was noted recently at Thetford.

[Further reply to "SUPER-CLAUD."]

Narrow Gauge Railways.

As the Vale of Rheidol and Welshpool and Llanfair lines were both owned or worked by the Cambrian Railways prior to grouping separate particulars of locomotives and rolling stock were not published. Both have, however, been described in the RAILWAY MAGAZINE, but we have no up-to-date statistics in this respect. The Vale of Rheidol had three locomotives, 14 passenger coaches, three other vehicles and 23 goods vehicles.

[Reply to "DDUALLT HALT."]

Lock-and-Block Signalling.

In the lock-and-block the actuation of the plunger at the box in advance rings the bell in the rear, changes the indicator and takes the lock out of the starting signal. As the signalling at London Bridge is now being altogether changed, there is little purpose in answering your question. The Elephant and Castle starting signal has a semaphore arm, but Blackfriars Junction distant under it is a two-aspect light signal —a single yellow and a green.

[Reply to H. A. POPER.]

Seaboard Air Line.

Mr. Norman Thompson writes: "When a line in the United States takes a fairly direct course between its objectives, it is called an 'air' line, or one untroubled by terrestrial obstacles. The idea, in this instance, is that of a direct line parallel to the Atlantic coast or 'seaboard.' A shortened form, 'Sea Air Line' is frequently used, but has no connection with 'ozone'!"

[Further reply to MEYRICK J. H. CRAMB.]

Main-Line Locomotives on Secondary Duties.

There is nothing exceptional in a first-class main-line engine being seen on occasions working stopping main line or even branch and local trains, in that there are certain turns which include such duties, or it may be that the engine is meeting a temporary requirement. At times, too, engines fresh from the shops are run for a few days on local duties to get them into running order again.

[Reply to "ACADEMICUS."]

London Road Station, Manchester.

Reference to a description of this station in the October, 1901, issue, shows that the order of platforms in the L.M.S. section is No. 1, two middle lines, No. 2, No. 3, one middle line, No. 5 and two sidings. We are not aware of an old platform having existed between No. 1 and No. 2, and do not understand why the platforms should now be numbered, as you state, No. 1 and Nos. 3—6.

[Reply to C. R. PRESCOTT.]

Working of Ljungström Turbine Locomotive on L.M.S.

This locomotive is not in regular service, and only works occasionally on experimental trips. These, when made, are usually on the 10.47 a.m. from Derby to Nottingham and St. Pancras, and the 2.25 p.m. from St. Pancras to Derby, but it is impossible to give in advance any dates when the engine may be expected to run.

[Reply to A. W. FLOWERS.]

Loading Gauge, Metropolitan "Widened" Lines.

The loading gauge on the "widened" lines of the Metropolitan Railway and

Digitized by Google

through Snow Hill is somewhat less than that of most main lines, so that restrictions apply to engines and rolling-stock working thereover. So far as we know, however, the present Southern Railway electric stock could pass, if need arose.

[Reply to M. H.]

Narrow-Gauge Railways.

The following 3-ft. gauge railways are now included in the Great Southern (Ireland) system :—Cavan and Leitrim ; Cork, Blackrock and Passage ; Cork and Muskerry Light, and Donoughmore Extension ; Schull and Skibbereen ; South Clare, Tralee and Dingle ; West Clare, G.W.R. narrow-gauge lines are : Welshpool and Llanfair, Vale of Rheidol.

[Reply to J. R. B.]

Irregular Tablet Working.

The accident on the Campbeltown and Machrihanish Light Railway in 1910, described as due to irregular tablet working, was attributed to interference with the apparatus by a linesman, which rendered it possible for two tablets to be out simultaneously. We hope to publish a new article on the Eskdale Railway in an early issue.

[Reply to "DDUALLT HALT."]

R.O.D. Locomotives.

The reply published in the March number referred to the particular class of 2-8-0 locomotives which were constructed for the War Department. These were of Great Central design. Obviously, they were not the only 2-8-0 locomotives in service, in that the type had already become a standard one on several lines, as you point out.

[Reply to C. R. H. SIMPSON.]

4-2-2-0 Locomotives, Southern Railway.

The engine shown in the 1927 report as a 4-2-2 is the last remaining of the six 4-2-2-0 locomotives designed by the late Mr. Dugald Drummond, having the driving wheels uncoupled, two cylinders driving each pair. These engines have been described many times in these pages.

[Reply to S. E. R.]

Locomotive Acoustics.

Irregularity in the exhaust of two-cylinder simple engines, is just as readily attributable to inaccuracy of valve-setting as in a three-cylinder locomotive. With a four-cylinder engine whose cranks are set to 90 deg., irregularly-sounding exhaust is unlikely, as the exhaust beats emerge in pairs.

[Reply to F. J. BUCKLEY.]

Lineside Signs.

We have no definite information on the lineside signs you mention. "Whistle" signs are always intended as a warning, and the one that you mention at Aldermaston may be to warn staff on the station or at the troughs as to the approach of trains.

[Reply to M. S. WOODROFFE and R. DYSON.]

G.N. and N.E. Sections Pacific Locomotives, L.N.E.R.

On the basis of tractive effort developed at 85 per cent. of the boiler pressure, Mr. Gresley's Great Northern 4-6-2 engines exert 29,835 lb. The figure for Sir Vincent Raven's 4-6-2 for the former N.E. Railway is 29,918 lb., so that on this bais the N.E. engine is the more powerful of the two.

[Reply to J. H. BILES.]

Sentinel Locomotives.

So far as we are aware, all the "Sentinel" locomotives at present in service on the L.N.E.R. and other lines have been introduced since grouping. There have, however, been one or two trial introductions of light petrol locomotives, and it may be one of these of which you are thinking.

[Reply to J. G. BROWN.]

Southern Railway Locomotives.

We have no information as yet of a proposed locomotive renumbering scheme for the Southern Railway. The "River" class engines are now back in service, though it is possible that they may be altered in certain respects before they are again used for working express passenger trains.

[Reply to "RIVER FROME."]

L.N.E.R. No. 3990.

This engine, famous as No. 990, and named *Henry Oakley*, was the first of the

Digitized by Google

Great Northern 4-4-2 locomotives designed by the late Mr. H. A. Ivatt. It is now, we understand, working frequently between London and Cambridge.

[Reply to J. H. ELLIS.]

Welsh Highland Railway.

The slate truck noted by you at Minfford lettered "C. R." may be one belonging to the Croesor Tramway, which joins the Welsh Highland line north of Ynysfor. It could hardly be a Corris Railway vehicle as the gauge of that line is 2 ft. 3 in.

[Reply to R. W. FITZJOHN.]

Articulated Suburban Trains, L.N.E.R.

We have now obtained exact information in regard to this matter, and find that the quintuple suburban sets in use on the Great Eastern Section weigh 104¾ tons each, or 209½ tons per complete train of ten coach-bodies.

[Further reply to G. PEMBER.]

Locomotive Resemblances.

No particular stress should be laid upon occasional resemblances in minor parts between the locomotives of various railways, in that frequently their design has followed similar lines of development.

[Reply to P. J. COOK.]

L.N.W.R. Locomotives in L.M.S.R. List.

The 0-8-0's of class "G 2" formerly belonging to the L.N.W.R. are numbered from 9395 to 9454 in the L.M.S.R. official engine lists.

[Reply to F. R. WHITING.]

Locomotive Valve Gears.

The G.W.R. four-cylinder locomotives have the Walschaerts valve gear. Some of the other classes, however, use the link motion.

[Reply to G. E. SHIPP.]

L.M.S.R. Locomotive Names.

The names of L.M.S.R., L.N.W. section, locomotives Nos. 5483 and 5637 are, respectively, *Stephenson* and *Edward Gibbon*.

[Reply to K. R. VASEY.]

9.10 a.m. Euston to Birmingham.

This express, leaving Willesden at 9.21 a.m., is almost invariably worked by an engine of the 3-cylinder compound Midland type.

[Reply to "HIGHLAND CHIEFTAIN."]

Caprotti Valve Gear.

THE "Royal Scot" locomotives, L.M.S.R., are fitted with Walschaert valve gear, and not with the Caprotti motion.

[Reply to J. H. BILES.]

British Locomotives for Shipment Overseas.

Presumably the locomotives noted by you in Trafford Park sidings, C.L.C., were for the Assam Bengal Railway.

[Reply to R. DYSON.]

Colours of Highland Railway Coaches.

Prior to grouping, these were painted green, substantially the same colour as that adopted for the engines.

[Reply to R. K. CURRIE.]

L.M.S.R. Locomotive Numbering.

The new L.M.S.R. number allocated to "Claughton" class 4–6–0, formerly No. 321, *Henry W. Longfellow*, is 5617.

[Reply to K. R. VASEY.]

4-6-2 Locomotives, L.N.E.R.

We hope to give particulars in due course of the new engines of this class under construction and their names.

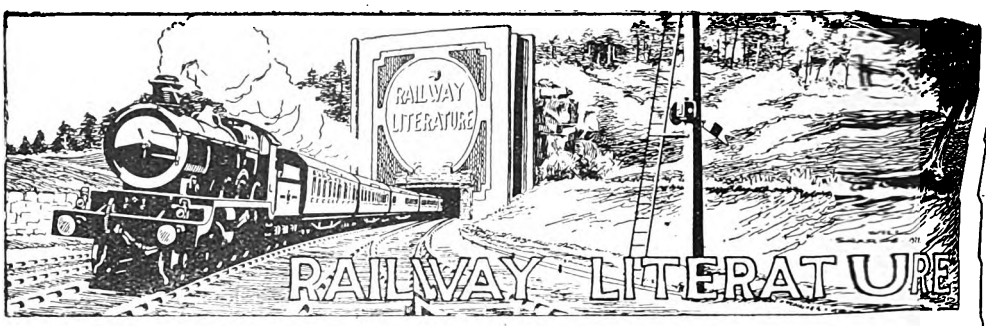
[Reply to P. A. HARGREAVES.]

Locomotive Workings on the G.W.R.

Mr. L. B. Hewitt writes:—"'King' class locomotives are at present precluded from running between Swindon and Bristol *via* Bath. On the authority of the *Great Western Railway Magazine* it is stated that a bridge over the River Avon, immediately west of Bath station, is to be strengthened before these engines are used on the Bristol and Plymouth services, *via* Bath. Whether these engines work to Bristol *via* the South Wales direct line, I cannot say. Doubtless some Bristol reader could inform you on this point. Evidently the first of the type *King George V*, has worked through Box Tunnel on one occasion, as she is shown emerging on the west side in the souvenir issued in connection with the Baltimore & Ohio Railroad Centenary by the Great Western Railway Company."

[Further reply to "CAERPHILLY" and "PAIGNTON."]

Digitized by Google



RAILWAY SIGNALLING. By S. T. Dutton, M.Inst.C.E., late Deputy Chief Engineer, East Indian Railway. [Published by Crosby Lockwood & Son. Price 7s. 6d. net.]

Described as a practical manual for engineers, transportation officers and students, this volume may be commended as a good general treatise on the subject, providing that it is realised that, frequently, the author has in mind Indian railway practice, so that, here and there, portions must be interpreted on that basis and not as necessarily according in every detail with English practice. In this respect, we note, particularly in Chapter I, which deals with fixed signals, that the author speaks of run-by signals as including "warners" as well as distant signals. The former are described as being fishtailed and generally corresponding to a distant signal, but at night having a fixed green light about 7 ft. above, and in a vertical line with, the lamp of the arm. This type of signal appears to be peculiar to Indian practice. Similarly, under the heading of approach signals, the author seems to have in mind, here and there, Indian railway conditions and methods, though this is not explained. Except for occasional points of this kind, however, the descriptions agree more or less with practice in this country. Chapter II deals with single-line working as on British lines, and some interesting track diagrams showing arrangements at crossing stations are included. Reference is also made to operating methods and later in the same chapter the author turns definitely to single-line working as practised on Indian railways. Chapter III similarly deals first with double-line working as on British lines and then considers methods in force in India. Chapter IV discusses differences between single-line and double-line working, thus leading up to Chapter V, which is concerned with various aspects of double-line working, though, here again, it is sometimes difficult to appreciate how far the author is considering Indian or British practice and how far his remarks can be considered as generally applicable. Chapter VI deals with signal cabin design, lever frames and signal connections, the last mentioned, which includes consideration of point and signal connections from the box to the point of operation, receiving further attention in Chapter VII, which deals particularly with rod connections, facing point locks, the control of outlying points and certain features of interlocking and electrical control. Chapter VIII deals with rod compensators, Chapter IX with the preparation of locking charts and locking tables, Chapter X with interlocking at junctions, and Chapter XI with the interlocking of facing points. An appendix includes specifications for signalling material of various kinds.

TRADERS' RAIL CHARGES UP TO DATE. By J. W. Parker, A.M.Inst.T. [Published by Sir Isaac Pitman & Sons Ltd. Price 3s. 6d. net.]

Described as "a concise and practical guide to the new system, written from the trader's point of view," it is stated that the book has been written with the object of explaining, not the Railways Act of 1921 in its entirety, "but just so much of it as the trader requires in order to know the new arrangements and what he should pay for rail transport." Chapter I describes the situation generally; Chapter II summarises the portions of the Railways Act of 1921 concerned. Chapter III deals with classification, the foundation of the rating scheme, the author contrasting the old general railway classification with the new classification book and considering the principles governing classification. He also explains the sub-classes and compares the old and new classes, this chapter including a useful table. In Chapter IV economies through classification are considered, including the use of containers, packing, conveyance of bulk goods, and certain exceptional rates. Chapter V deals with standard rates, Chapter VI with the Railway Rates Tribunal, its work and its powers; Chapter VII with procedure before the Rates Tribunal, including forms for applications, objections, &c., associated with this procedure. Exceptional rates are discussed in further detail in

Digitized by Google

Chapter VIII, and owner's risk rates in Chapter IX. Cartage, small consignments and returned empties are dealt with in Chapter X; passenger charges and insurance in Chapter XI, and standard conditions of cartage are set forth in Chapter XII. A useful and comprehensive index is included.

PERMANENT WAY. By the late W. H. Cole, M.Inst.C.E. Revised by Sir Gordon Hearn, C.I.E., D.S.O., A.Inst.C.E. [Published by E. and F. N. Spon Limited. Price 12s. 6d. net.]

This is the ninth edition of a well-known standard work, and has not only been brought up to date, but practically re-written by Sir Gordon Hearn, who has had 35 years' experience in this subject, and it now embraces English and American practice, as well as Indian. The principal features of this new edition include: illustrations of recently-designed standard types of British railway points and crossings; standards proposed by the American Railway Engineers' Association; results of recent experiments in the United States concerning stresses produced in the track by the exceedingly complex action of trains running over it; fishplates, iron and steel sleepers invented in recent years; latest British Standard Specifications for the composition and inspection of material; recent practice in laying, maintenance and renewal of track, with records of wear, drawn from many countries. The chapter dealing with the latest practice in the design of points and crossings, with special reference to weak parts and their strengthening, has been considerably expanded. The theoretical calculation of leads and radii of turn-outs has been clarified, and practical difficulties have been compared with theoretical perfection in formulating recommendations. In view of the esteem in which this work is held in railway permanent-way engineering circles, this new edition will, no doubt, be welcomed by a large number of readers. It is well printed, with numerous drawings and diagrams, and a folding plate, while the calculations included are kept as simple as practicable.

VERKEHRSWERBUNG BEI DEN EISENBAHNEN.

By Dr. Adolf Sarter. (Berlin: Verkehrswissenschaftlichen Lehrmittelgesellschaft m.b.H.). 8¼ in. × 6 in. × ⅞ in. 218 pp., with eight coloured plates. Paper cover. Price not stated.

This book deals broadly with the whole field of railway propaganda, traffic opportunities and the securing of traffic, with special reference to German conditions and problems. Intensive publicity is a comparatively recent development in Germany, but the author has evidently studied the subject closely, and his systematic analysis of the various classes of traffic and the best means of securing them will be read with interest by many besides those for whom it is primarily intended. Throughout the book the author refers frequently to English methods, and it is evident that he made good use of the facilities afforded him when he visited this country recently. Of the eight coloured plates reproducing typical railway posters, four are German and four English (two L.M.S.R. and two S.R.). The author's analysis of the special features of the English posters makes very interesting reading; and the artists responsible for these designs may congratulate themselves that their messages "got over" with complete success.

The first part of the book deals with general questions such as the need for railway propaganda; the competition of waterways, motor traffic and air transport; traffic studies and their applications; the restricting influence of customs; the gradation of passenger and goods tariffs in relation to competing services; advertising methods and media; and the organisation of publicity departments. The second part of the book deals specifically with passenger traffic, baggage and express goods traffic, and ordinary goods traffic, giving statistical and other information for each (mainly from the Reichsbahn records), together with suggestions for fostering business. The appendix includes interesting tables, and the book is well indexed.

THE L.N.E.R. has issued 15,000 copies of an attractive folder entitled "Wool Through Hull," for distribution in Australia and New Zealand. The folder, which has a two-colour pictorial cover, is illustrated by half-tone blocks and mentions the numerous facilities and up-to-date equipment which make Hull Britain's natural wool port, and is intended to draw the attention of Australasion shippers to the advantages of consigning wool *via* Hull.

MESSRS. ARTHUR H. STOCKWELL LIMITED, of 29, Ludgate Hill, London, E.C.4, send a copy of a song, entitled "The Express Driver," words and music by Tom Innis. Copies can be had at 2s. net each. The cover shows a fine view of a Great Western express train, which is well reproduced, and the song is clearly printed. It appears to be quite a good one of its class and should prove a useful addition to the somewhat limited repertoire of songs suitable for railway concerts and gatherings of other kinds of

Digitized by Google

those concerned with, or interested in, various aspects of railway working.

To the Blue Canadian Hills. By Dorothy Una Ratcliffe, F.R.A.S., F.R.G.S. [Published as the 1928 Supplement to *The Microcosm*, by the North Country Press, City Chambers, Leeds. Price 2s. 6d.]

This booklet, described as a travelogue, gives an account of "a week's log in a Northern Quebec camp," and is designed to direct attention to the attractions of the Canadian hill country. It is beautifully produced, having a number of photo-prints affixed to otherwise blank pages, while the text is artistically displayed, with wide margins and other features associated with publications of the kind in question. The text is prefaced by a "Foreword" in verse and closed by a corresponding "Envoi." It is pointed out that the gross profits from this publication will be given to the Canadian Red Cross (Junior Branch).

From the North British Publicity and Distributing Co. Ltd., of 19, Main Street, Govan, Glasgow, we have received a sample tin of a liquid known as "Emulsol." This has been prepared for cleaning the hands, and will be of particular interest to those members of the railway service, who, in the course of their duties, are called upon to handle greasy and oily articles and parts of equipment. A small quantity of the liquid is rubbed into the hands until they become dry and sticky, they are then moistened with sufficient water, which may be either hot or cold, to give a good lather, and afterwards rinsed well in water. The oil and grease will then be found to have been effectively removed. The liquid contains no injurious chemicals and does not in any way harm the skin. The preparation is marketed in tins of a convenient size for carrying in the work bag or keeping in the bench drawer or tool box. It is sold at 1s. per tin.

Locomotive Management from Cleaning to Driving. By Jas. T. Hodgson, M.I.Mech.E., and the late John Williams. [London: *The Railway Engineer*, 33, Tothill Street, Westminster. Price 5s. net.]

The sixth edition of this handy reference work, intended for drivers, firemen, cleaners, and the running-shed staff associated with locomotive maintenance and operation, has been thoroughly revised and brought up to date. A large amount of new material has been added, while some older matter, which modern developments have rendered obsolete has been omitted. In the chapter entitled "Description and Erection of Engines," full descriptions, with illustrations in the form of line drawings, of the Caprotti and Lentz patent poppet valve gears, are given. This constitutes, we believe, the first occasion on which articles dealing with these gears have appeared in a text-book of this character. The major portion of the chapter on Superheating, has been entirely rewritten and new illustrations provided. The chapter on lubrication has been similarly re-written and re-illustrated in accordance with the latest principles employed in the lubrication of modern locmotives. The chapters dealing with the subject of firing, boilers, and brake gear have also been carefully revised and amplified. Reference is made to the latest developments in the use of high-pressure steam, water-tube boilers, turbo-condensing locomotives, and the Kitson-Still internal-combustion steam locomotive. A large number of half-tone reproductions from official photographs of the various types of locomotives in operation in this country are given, and these are thoroughly up to date in all respects. In this connection, we may mention the illustrations of the "King" class locomotive, G.W.R., forming the frontispiece; "Royal Scot" and "Garratt" classes, L.M.S.R.; "Pacific" "Mikado," "Garratt," and "Shire" classes, L.N.E.R.; "Lord Nelson" class, Southern Railway; the Ljungström turbo-condensing locomotive, constructed by Beyer, Peacock & Co. Ltd., and recently tested in service on the L.M.S.R.; and the new Kitson-Still internal combustion steam locomotives, recently constructed at Leeds. These illustrations are accompanied by particulars of the principal dimensions of the engines, thus rendering the book a handy reference work for the locomotive student. In addition, the Appendix contains a number of illustrations of typical locomotive footplates with the fittings numbered, and a key provided showing the particular function of each fitting. These illustrations include footplates of the G.W.R. "King"; L.M.S.R. "Royal Scot"; L.N.E.R. "Pacific," and the S.R. "Lord Nelson" class locomotives. In addition to the technical descriptions of the locomotive components given in the book, there are also chapters on rules, signalling codes, duties of the driver, &c. The chapters on examinations on the boiler, engine, brakes and breakdowns, given in the form of questions and answers, are a useful feature and assist toward a better understanding of the principles of locomotive operation. Within the comparatively small compass of 449 pages this book provides a vast amount of information on the loco-

Digitized by Google

motive and its management, presented in such a form as to be readily understood by the average engineman and members of the running-shed staff. It is written in non-technical language, and a study of its pages cannot fail to be of assistance to the engineman in the course of his duties. The new edition more than maintains the standard of previous editions and will, no doubt, retain its position as a most suitable text-book for use in locomotivemen's mutual improvement classes. The comparatively low published price of 5s. net should bring it within the easy reach of all.

MR. C. R. ENOCK, of Froxfield, Hants., sends a pamphlet entitled "The New Type of Railway—A Revolution in Land Transport." Unfortunately, it tells us very little about the scheme, nearly the whole of the pamphlet being occupied in obvious explanations of the travel possibilities offered by very high speeds; that overhead suspended railways are clear of surface complications; that such lines require the erection of supports instead of the laying out of a level track with embankments, cuttings, &c.; that single-car trains can be stream-lined to reduce air resistance; with a few other points which are equally self-explanatory. Putting two and two together, and recalling proposals advanced years ago by Mr. Enock, the scheme appears to be merely the familiar one of wide overhead rails upon which run the driving wheels, guiding wheels taking the place of wheel flanges, while the cars are suspended. Claims are made for "special outer tyres of high frictional capacity," the same material being also used for guide wheels and for rail surfaces on steep gradients, while "safety skates" and special brakes are mentioned. It is also suggested that the track can follow the contour of the country, using gravity on the dips to assist following ascents; air propellers are mentioned as possible alternatives to traction wheels. On the whole, however, it is difficult to see what there is beyond proposals which have come forward at intervals for the last fifty years or so, some of which have been exhaustively and critically considered on the basis of practical adoption, though the old Barmen–Elberfeld line in Germany and two or three others here and there are the only ones which have been actually constructed and used.

"HOLIDAY HAUNTS—SEASON 1928."—This publication, as is well known, is the official guide to the holiday resorts served by the Great Western Railway, and is published by the company at Paddington station, London, W.2. Year by year its bulk increases—the present issue runs to 964 pages and includes a special supplement containing much useful information concerning steamship services, manufacturers, &c., many maps, and numerous beautiful half-tone views of the various holiday resorts and places of interest which are covered by the company's system. Great care is taken in the classification of the varied matter to be found within its pages, and which not only shows holiday-makers of all classes and every nationality how to secure maximum of change, rest, and pleasure or sport at a minimum of expenditure and fatigue, but also provides him with a comprehensive list of farmhouse and country lodgings, boarding establishments, and hotels. A finely-coloured view of "The Malverns" is given as a frontispiece. 175,000 copies were issued last year, and 200,000 are being provided this year. Copies can be obtained at the price of 6d. at all Great Western Railway stations, offices, agencies, and bookstalls; it can be ordered through the trade booksellers, or it will be sent to any address by the Superintendent of the Line, G.W. Railway, Paddington, upon application accompanied by a remittance.

THE EXTRA PASSENGER. By Douglas Timins. [Hutchinson & Co. (Publishers) Limited. Price 7s. 6d. net.]

BY the author of "The Phantom Train," incidentally a contributor to the RAILWAY MAGAZINE in early days, this new novel can be recommended as a "thriller" with unconventional features. Further, it has a degree of railway interest, in that the story arises from the mysterious murder of an "extra" passenger on a Buenos Aires–Villa Mercédes express of the Buenos Ayres & Pacific Railway, while the reader is also introduced to certain features of travel in the Argentine Republic and on the Transandine Railway. An incidental character is, too, an absent-minded American professor of natural history, who spends odd half-hours in reading an English Bradshaw. The first part of the story is laid in the Argentine Republic, but it is completed in the wilds of the Scottish Highlands. Even to indicate the nature of the plot would spoil readers' appreciation of the well built-up story. Mysterious blue rays, motor-cars without visible means of propulsion, train stealing, a "Hanging City," and other exciting ingredients are freely used, and the result is an extremely readable albeit extravagant detective yarn. Three of the leading characters in "The Phantom Train" appear, Philip Cartwright, the detective, and Sir Staveley Richards, neurologist, &c., as principals, and John Burnside, at critical stages of the story.

Digitized by Google

THE WESTINGHOUSE BRAKE & SAXBY SIGNAL CO. LTD., of 82, York Road, King's Cross, London, N.1, send a booklet reviewing "Thirty Years of Power Signalling, 1897-1927." This includes brief particulars of the more notable and representative installations of power signalling carried out by this firm, including examples in Australia, Egypt, France, Germany, New Zealand, South America, Sweden, Holland and Ireland, together with the Southern, Great Western, L.M.S., L.N.E., "Underground," Metropolitan, and Liverpool Overhead Railways, in the case of Great Britain. The booklet includes a useful summary of the principal installations.

THE LOCOMOTIVE PUBLISHING CO. LTD., send a chart of the Southern Railway locomotive *Lord Nelson*. This is included in a booklet, the cover of which bears a view of the engine in colour. The text includes particulars of the engine, while the chart is in section, suitably coloured and lettered, with reference to a table of parts, to render the main features of construction clearly apparent. Plan and sectional drawings are also reproduced. Copies can be had from the publishers, price 1s. 6d.

LOCOMOTIVES OF THE SOUTHERN. Second edition. [Price 1s.]

This new edition of the interesting booklet under this title published some time ago includes a number of line sketches of older and historic locomotive types, which add very greatly to its interest, constituting an effective introduction to the later section, which includes illustrations and particulars of the modern types of locomotives now in service. There are also several train views, with lists of named engines of the present standard classes. A colour view is included showing the *Lord Nelson* on the "Atlantic Coast Express," this being placed next to the front cover, which is cut out, so that it constitutes a frame for the picture. Copies can be had at all Southern Railway inquiry offices, at railway bookstalls, or direct from the Advertising Department, Waterloo station.

REICHSBAHN-HANDBUCH, 1927. [Published by Verlag der Verkehrswissenschaftlichen Lehrmittelgesellschaft m.b.h. bei der Deutscher Reichsbahn, Berlin. Price not stated.]

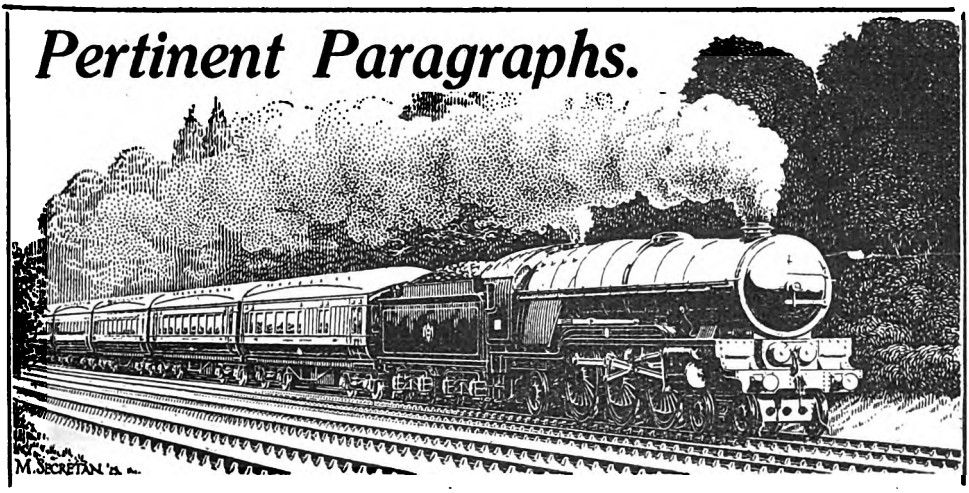
This volume of 658 pages, with 32 maps and plans (utilising colour for differentiation) contains a wealth of useful information in regard to the German railways. The first part deals with the organisation of the railways. There are also sections devoted to statistical aspects, personnel, &c., largely given in the form of tables and tabular statements.

AN amusing account of the circumstances attending the introduction into Canada of her first steam locomotive is contained in a new booklet "Modern Travel in Canada," just issued by the Canadian National Railways. This engine was brought from England in 1835 to be used on the Champlain and St. Lawrence Railroad, a 16-mile track which had been laid between La Prairie on the St. Lawrence and St. John's on Lake Champlain. It gloried in the name of "The Kitten," and was bought by the infant railroad to supplant the horses which during the first year of the line's existence had been used to haul the rickety coaches between the railroad's terminal points. "The Kitten" was placed on the rails on a dark night in 1836—policy dictating a nocturnal trial. Steam was got up and the signal given to go—but "The Kitten" refused to move. The directors, in despair, called in an engineer from the Baltimore and Ohio Railway, which at the time was operating successfully south of the border. This expert diagnosed "The Kitten's" trouble to be lack of fuel and water. When these were supplied the stalled engine took on a new lease of life and, jolting and bumping over the rough road-bed, tore south towards St. John's at the then break-neck speed of 20 miles an hour. This historic railroad today forms part of the Canadian National Railways' system, whose tracks extend for 23,000 miles through every province of the Dominion.

WE have received from the Industrial and Development Branches of the Canadian Pacific Railway, an interesting folder dealing with their work. It includes a map of the Dominion of Canada, indicating natural resources, a number of interesting views, and items of interest to manufacturers and others to whom the facilities offered by the Canadian Pacific Railway in this connection are likely to appeal.

Digitized by Google

Pertinent Paragraphs.



Railways and Road Powers.

THE fact that the L.M.S.R. Bill (with those of the other companies) applying for wider road transport powers was given a second reading on February 29 by the substantial majority of 357 (399 for and 42 against) must be regarded as distinctly satisfactory. Good speeches were made in opposition, but, as *The Times* puts it, the case against the Bill was open to the criticism that they were either anticipating troubles which need never arise, or attributing malign motives which do not exist. Mr. E. C. Grenfell stated the case for the railway companies very effectively, emphasising that clauses in the Bill and other considerations would effectually prevent unreasonable action by the railways, though it was time "harassing restrictions were removed from the railways." Mr. Mitchell Banks pointed out that the powers sought would not give the railway companies anything in the shape of a monopoly, though the road transport agencies appeared to be asking that the partial monopoly which was now theirs should be maintained and that a newcomer should not be allowed to enter the field. Towards the end of the proceedings, Major Glyn, on behalf of the railway companies, explained that they would be prepared to accept all amendments calculated to prevent cut-throat competition, profiteering, or the withdrawal of services for which there was public demand. Colonel Ashley, Minister of Transport, explained that this was not a new departure on the part of the railway companies, who were only asking for an extension of powers already granted to them and allowed, though under different conditions, in almost every other country. He was disposed to suggest the inclusion of a clause to make it obligatory on the companies to report to the Minister of Transport when they instituted a service, though this would probably add considerably to the responsibilities of the Department. Mr. J. H. Thomas pointed out that if the Bill was rejected "there could, to-morrow, be set up on the roads of the country 1,000 private companies which could do precisely the same things as the railway companies were now asking permission to carry out." Further, Parliament would have no voice whatever in the matter.

The G.W.R. Annual Meeting.

SATISFACTION with the excellent dividend of 7 per cent. was expressed generally at the annual meeting of the Great Western Railway Company. Mr. W. J. Stevens made the further point that while this was the first occasion since grouping on which the Great Western, like the three other big companies, had paid its dividend fully out of earnings, it was the only one whose ordinary stock stood at a premium. In the course of his address, Viscount Churchill called attention to the satisfactory increase of £363,515 in the net receipts from ancillary businesses, which was largely attributable to increased receipts and diminished expenses at the South Wales docks. He also welcomed the appreciation shown by shareholders of the good results achieved in the road transport department. The Chairman congratulated Mr. Collett on the skill and ability shown in the design of the new "King" class locomotives, which met traffic requirements more expeditiously with decreased expenditure, and had given English railways such a good advertisement in America. On the subject of road transport, he referred to the 11¼ per cent. dividend recently paid by an omnibus company, the report of which showed no capital outlay nor maintenance charges for roads and only insignificant pay-

Digitized by Google

ments for local rates. In meeting road competition the company has made a feature of cheap travel bookings. Whereas in 1925, approximately 34 per cent. of the passengers were carried at full fares, and the remaining 66 per cent. at the cheaper rates, in 1927 the respective proportions were approximately 25 per cent. and 75 per cent. Much revenue has been thereby preserved. The excellent team spirit of the officers and staff which was shown in the economies effected and the business secured in the face of severe competition was also the subject of appreciative remark.

L.M.S.R. Annual Meeting.

In his maiden speech to the shareholders of the London Midland & Scottish Railway Company, Sir Josiah Stamp gave an encouraging account of the progress of the spirit of co-operation among the staff, which is already translated into figures. Suggestions from the staff, which have been adopted, have resulted in a number of economies, small perhaps in themselves, but aggregating a considerable sum, as a saving of £4 per employee in a staff of 270,000 would represent a total of over £1,000,000 a year. Modernised appliances and methods in the company's shops have produced a more efficient type of vehicle at a lower cost to the company, while the men on the work have been able to earn more money. A further effect of this improved practice is that the number of items requiring repair is materially lessened, while the stock available is giving better service. Locomotive standardisation is steadily reducing the number of types in use, and the latest development in the shape of the "Royal Scot" class is giving remarkable results. This more powerful type of locomotive does away with double-heading, and the non-stop run between Euston and Carlisle, which its adoption has made possible, is a result of economic working and only incidentally a world's record daily non-stop run. By putting the stop and change of engines on the 10 o'clock Euston-Glasgow service at Carlisle, the service can be met by three of the "Royal Scot" class in place of eight of other types formerly necessary. Attention was also drawn by the Chairman to the good results already obtained from the use of containers and from railhead distribution.

L.N.E.R. Annual Meeting.

The more vocal shareholders at the London & North Eastern Railway meeting, who were smarting at receiving for 1927 only the amount actually earned on the preferred ordinary stock during the year, seemed unable to appreciate the remarkable operating economies effected. As Mr. Whitelaw explained, these had led to net receipts nearly 2½ millions above those of 1925. To have carried 5,345,000 more tons of goods traffic than in 1925, with the consequent increase in train-mileage, and yet to have saved more that 3 per cent. in traffic expenses, is an achievement which could not have been brought about without intensive effort on the part of the management and hearty co-operation by the staff. The Chairman paid an appreciative tribute to the manner in which the staff had thrown themselves willingly into schemes for improved economy and efficiency, such as new signalling appliances and the extension of train control. On the subject of capital expenditure Mr. Whitelaw said that the £285,000 spent on the Whitemoor (March) marshalling yard would amply pay for itself by the relief and consequent economy in working which it would afford, and by avoiding the necessity for more yards in the London area. In the new yard an entirely new method of controlling shunting would also give greater safety to the shunting staff and reduce the risk of damage to wagons. Satisfactory growth in the Continental traffic, and the fact that the revenue from first-class passengers all over the system showed less reduction during the past two years than that from any other class, were also mentioned. On the subject of the road transport powers sought by the railway companies, Mr. Whitelaw pointed out that it was the omnibus companies who feared the end of their present monopoly, while their regulation in the matter of speeds hours, and wages was long overdue.

Southern Railway Meeting.

At the Southern Railway annual meeting, which was very largely attended, much time was occupied by shareholders in unhelpful criticism, but the general appreciation of the Board's policy was shown by the almost unanimous return of the five directors who came up for re-election. Mr. Gough's proposed candidature for a seat on the Board was ruled out of order for non-compliance with the necessary statutory notice, but he addressed the meeting in support of the statements he had made in a circular letter to the shareholders, and eventually withdrew the amendment which he had proposed, on the chairman agreeing to meet him and two or three other shareholders who supported his views. In his comparison with the results of the year 1925, the chairman pointed out that in 1927 the revenue from ancillary businesses was £88,000 higher. Expenditure had been reduced by £378,000, though the average price of coal per ton was very much higher due to the enormous cost of the foreign coal which they had had to use up in the first three months of 1927. Though the opening

Digitized by Google

of the City & South London extension to Morden had taken away 4,000,000 people from their line, yet in the electrified area the Southern's passengers had increased by 1¼ million. The money spent on electrification had already produced handsome profits, and the work was still being extended. Continental passengers had increased from 1,977,000 to 1,985,000 in spite of the loss of the Flushing traffic, and the active competition of the Tilbury-Dunkirk route. Southampton docks traffic had exceeded even the record results of 1926. Alluding to the Sevenoaks accident, the chairman said that since amalgamation they had carried 300,000,000 passengers a year with only one death in a train accident previous to that disaster. They had set aside a sum to meet liabilities.

G.N.R. (Ireland) Annual Meeting.

INDICATIONS of a slow but steady improvement in the position of the Great Northern Railway (Ireland) were given by the Chairman (Sir George S. Clark, Bt.) at the annual meeting in Belfast. Though passenger receipts in 1927 were less than those in 1926, there was an increase of 34,000 in the number of ordinary passengers, and of 450, or 12½ per cent., in the number of season-ticket holders. This seems to show that the policy of giving cheap travelling facilities, coupled with efficient and rapid services, is bearing fruit, though any immediate advance in passenger revenue is unlikely, because even a considerable increase in the number of passengers at reduced fares does not prevent serious inroads on revenue. On the other hand, it is wholly satisfactory that railway working costs have been reduced by £91,000. Of this, the saving in locomotive coal accounts for about £38,000, the present cost of coal consumed per engine-mile being only 35 per cent. over 1913. During the greater part of the year, the company had the full benefit of the reduction given, by stages, under the decision of the Irish Railway Wages Board of April 22, 1926. The Chairman paid a well-deserved tribute, in which the shareholders joined, to the work of the officers and staff. In these times of keen competition such satisfactory operating results as had been achieved would not have been possible without intensive effort on the part of all concerned.

The Vacuum Brake on the L.N.E.R.

UPON amalgamation, the locomotives and carriages of the companies forming the London & North Eastern Railway Company were fitted with different types of automatic brakes. The rolling-stock of the Great Northern, Great Central, and Hull & Barnsley Companies was fitted with the vacuum automatic brake, whilst the North Eastern, Great Eastern, North British and the Great North of Scotland Companies used the Westinghouse air brake. Approximately half of the 20,400 carriages and 7,500 engines operated by the L.N.E.R. were fitted with each type of brake, but by the end of 1926 some 4,700 carriages and 1,100 engines were "dual fitted," *i.e.*, equipped with both types of brakes to facilitate the free interchange of rolling-stock between the various sections of the 7,000 miles of the L.N.E.R. system. "Dual fitting," however, is expensive to instal and maintain without any corresponding addition to the safe working of the trains. The L.N.E.R. then decided that the whole of its locomotives and passenger carrying vehicles should be fitted with the vacuum brake. This decision involves the conversion of some thousands of locomotives and carriages, and the great work of bringing about uniformity is to be arranged so that it will be completed in four years.

G.W.R. Holiday Accommodation Excursions.

SINCE the introduction of educational excursions by the Great Western Railway over 20,000 passengers have been carried. A further innovation is to be the running of "holiday accommodation excursions." The purpose of these excursions is to enable one or more resorts to be visited before a definite choice is made and for accommodation to be selected and booked on the spot, and the fares will be at the rate of three miles for a penny.

"It is too late to discover a mistake in choice of resort or accommodation when you are there," said a representative of the G.W.R. recently, "but the introduction of this new series of excursions is designed to help the public to make a decision that they will be satisfied with, and at the same time book their accommodation."

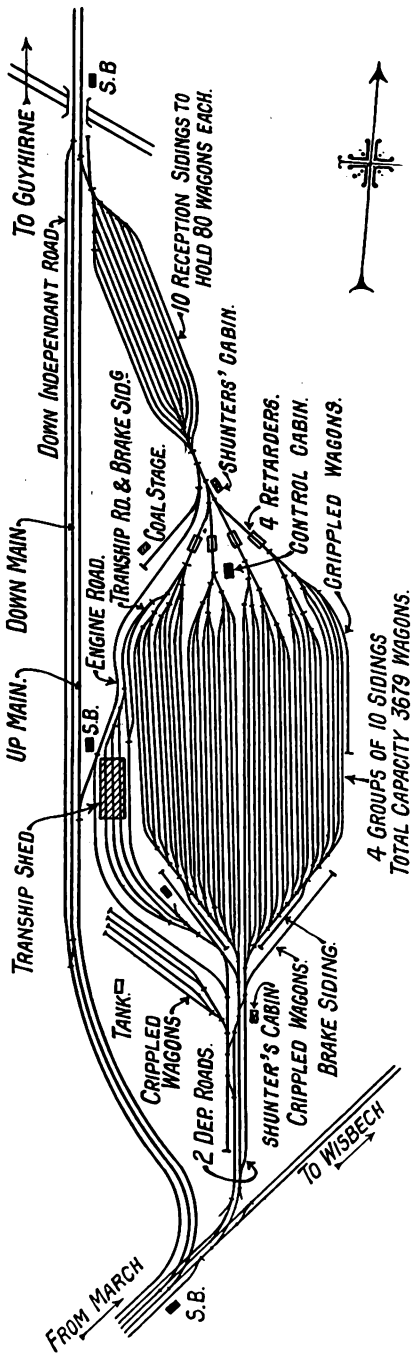
Bookings are to be given to a number of the larger seaside and inland resorts from Paddington, Reading, Newport, Cardiff, Birmingham, Wolverhampton, Stratford, Wellington, Shrewsbury, Chester, Liverpool and Taunton, and many local stations. These facilities will be increased as the season advances until practically the whole of the system has been covered.

Metropolitan Railway Meeting.

AMONG the satisfactory features in Metropolitan Railway working for the past year which were mentioned by Lord Aberconway at the Annual Meeting were the continued increase in longer-distance passenger traffic due to the expansion of the residential

Digitized by Google

areas served by the Uxbridge and Aylesbury lines, both of which have an admirable service. A gratifying decrease of £50,000 in locomotive running expenses was effected during the year, due largely to the lower price of fuel and to the more efficient working of the Neasden power station, through the introduction of more modern generating machinery. The operating ratio of 70·09 per cent. is also a matter for congratulation. In their policy of creating additional premises such as shops, offices and flats in every case of station reconstruction, the directors have been uniformly successful. The return is never less than 5 per cent., and in many instances is as much as 10 per cent. on investments of this kind, which also increase traffics by the improvement in the stations. An interesting statement was made by the Chairman as to "conversations" with the "Underground" Group, which, so far, have not resulted in any arrangement acceptable to the Metropolitan Company. As Lord Aberconway explained, the future of the Metropolitan lies outside the area of acute 'bus and tram competition, and his Board could not even discuss that position, and secure at least as good a return on the ordinary stock as was believed to be likely if the Metropolitan remained a separate undertaking.



GENERAL LAY-OUT OF NEW MARSHALLING YARD AT WHITEMOOR, MARCH, L.N.E.R.

New Marshalling Yard at March, L.N.E.R.

CONSIDERABLE progress has been made with the construction of the new marshalling yard at Whitemoor, March, and the L.N.E.R. announce that the work is now more than half finished. When completed, these new sidings will be the most up to date and largest set of sorting sidings in Great Britain. The total quantity of excavation necessary to level the ground and to provide the material required for embankments is 250,000 cubic yards, and already some 195,000 cubic yards have been excavated and tipped. The whole of the site has been fenced in and the culverts completed, and the laying down of the sidings is proceeding concurrently with the excavation. Over 7 miles of track out of a total of 29 miles, together with 2,300 cubic yards of slag and 7,600 cubic yards of ashes, have been laid to date.

The marshalling yard will be used for the sorting of general goods traffic, and will be operated by high-speed gravity shunting for which retarders or rail brakes are being installed. The installation of these "rail brakes" or wagon retarders is an innovation in British railway practice, and is the result of a world-wide inquiry into braking methods. Under this system the wheels of the wagon to be checked are squeezed between pairs of rails which press against the sides of the wheels. The pressure can be intensified or diminished as required. In all, four sets of brakes controlled from a central tower are being fitted. It is estimated that under the new braking system the sorting and marshalling of wagons will

Digitized by Google

ıke approximately half the time at present equired, and the risk of injury to men will e lessened. It is also claimed that rough nunting will be eliminated. The whole of he sidings are being equipped with the most fficient method of flood lighting known, which will enable work to proceed both by ay and night.

roposed Preservation of a Brighton "Terrier" Locomotive.

MR. O. J. MORRIS suggests that, in view f the special interest which attached to the ttle 0-6-0 tank engines designed by the ıte Mr. William Stroudley for the L.B. & .C.R. it would be fitting that one of them hould be preserved, and we invite our eaders' views in regard to the matter. he engines in question are the small 0-6-0 ank engines known as the "Terriers," and ometimes referred to as the "Rooters," hough we have no information as to the rigin of the latter nickname. Mr. Morris rites as follows :—

"I am now stimulated to action by a ecent renewal of acquaintance with the ıost noteworthy of all these engines, old No. 71, *Wapping*, at present spending its ld age on the Kent and East Sussex Railway as No. 5, *Rolvenden*. This engine, uilt for working the South London line, ut, at first, drafted to the East London line hen just opened, was the first of the class, nd, happily to relate, the one nearest in ondition to original. She was built in October, 1872. I should now like to appeal to ll 'Brighton' enthusiasts, and, indeed, to ll who are interested in the preservation of ld engines, to consider whether this famous Terrier' should not be saved from an ltimate scrap-heap. To save some of the ther engines of the class would mean an xtensive re-conditioning, as they have ndergone a considerable amount of rebuilding; moreover, they lack the interest hat *Rolvenden* possesses. If those interested vill compare the photograph of *Rolvenden* THE RAILWAY MAGAZINE, June, 1926, . 484) with that of her as *Wapping*, the atter taken in 1873 (THE RAILWAY MAGAZINE, April, 1919, p. 215), they will be able o confirm the fact that little would be necessary to put *Rolvenden* into condition as uilt. Engines of the class have been sold and re-sold, until to-day they may be found as ar away as South America, on tramway vork."

Den of Cowie Viaduct Derailment, L.M.S.R.

LT.-COL. A. H. L. MOUNT'S report to the Ministry of Transport on the derailment which occurred at the Den of Cowie Viaduct, between Muchalls and Stonehaven, L.M.S.R., on October 3 last, has been issued. As the 7.50 p.m. sleeping car express from Aberdeen to Euston, drawn by 4-4-0 engines Nos. 14489 and 14316, with a train of 13 vehicles, was approaching this viaduct at a speed of 50 to 55 miles an hour, the four leading coaches were partially derailed as the result of striking the air-brake reservoir which had become detached from the tender of the train engine. The third vehicle, Pullman car *Diana Vernon*, collided with the stone parapet at each end of the viaduct and carried away the intervening hand railing, the train coming to rest with the four derailed vehicles on the embankment at the far end of the viaduct. There were some 350 people in the train, but, fortunately, no one was seriously hurt, though subsequently seven passengers complained of shock, which number includes also one case of minor injury. The derailed coaches remained upright; but, as illustrating how much more serious the results might have been, it is sufficient to remark that the leading wheels of the Pullman had travelled within 15 in. of the ballast plate which supported the railing on the edge of the viaduct, the couplings throughout having fortunately held. The damage to the permanent way and stock was considerable. The train travelled 595 yards after the derailment commenced.

Colonel Mount concludes that this derailment was primarily caused by the fracture, due to vibration, of the leading brake stretcher rod on the tender of the train engine No. 14316, the result apparently of inherent weakness at a weld. "However, the piece of the rod concerned would not have fallen from the tender had the cotter been properly split and in place, and it follows that either there must have been failure to detect the absence of the cotter during the course of the previous examinations, or that insecurity permitted it to drop out during the journey from Aberdeen. It is significant that the corresponding inside cotter of the pointed end of the trailing rod was also missing, and it is inconceivable that the latter occurrence can have taken place in both cases after leaving the shed. It must be held, therefore, as most probable, that the examinations referred to were ineffectual."

"In regard to the manipulation of the brake and the reasons why the train reached the viaduct, the evidence shows that, notwithstanding the derailment, a not unreasonably lengthy stop took place, having regard to all the prevailing circumstances, viz., the darkness and therefore the non-realisation by either driver of what was happening; the time during which the leading engine at any rate remained in steam; the release of the Westinghouse brake on the train engine; the ineffectiveness of the vacuum brake on prob-

Digitized by Google

ably all four leading coaches; the falling gradient; the speed; and the weight of the train. In fact, I think that had more rapid retardation been effected, particularly in respect of the engines, the tendency to bunching in the case of the derailed vehicles would have been increased, thus adding to the serious liability which already existed. Altogether a very fortunate escape.

"This liability arose from the absence of wheel guards and of continuous parapet walling on this viaduct, and I think the case fairly represents the measure of additional risk which existed owing to their absence. It is also illustrative of the efficacy of the two short lengths of stout parapet walling at either end of the viaduct. The case is for the general attention of railway companies as showing the need for some method of preserving the alignment of derailed vehicles on such structures.

"As recently as last year there has been correspondence with the railway companies on the subject of the design of guards, located either inside or outside each rail, so that, in the event of derailment commencing upon the structure, the flange of a wheel would be prevented from traversing the rail while the tread of the corresponding wheel would be prevented from leaving the other rail. In addition, the splaying of such guards, in rear of the structure on either side, is advisable, in order to assist vehicles, which may have become derailed before the structure is reached, to follow the alignment of the track.

"I am informed that the company has already adopted a suitable design of splayed outside guard, combined with inside guards and a ramping arrangement, the function of the latter being to effect actual rerailment before the structure is traversed. I understand that provision in this respect is already in hand on a viaduct nearby at Elsick, and I am glad to report that similar steps are to be taken at the Den of Cowie."

London to Edinburgh Non-Stop?

Great public interest is being shown in the suggestion that this summer will see non-stop runs between London and Edinburgh by the L.N.E.R. and L.M.S.R. routes. There appears to be some warrant for the idea, in that statements have been issued on behalf of both companies which give it a degree of support. There is no doubt that the run can be made so far as the engines and rolling-stock are concerned, and the chief problem is, how best to provide relief for the engineman for so long a spell of continuous responsibility, and, in the case of the fireman, of physical labour. As to this, it is suggested that a corridor should be provided on the engine tender and connected with the train so that relief enginemen could take over the work at a suitable stage of the journey, and we understand that several schemes of this kind are being carefully considered. The difficulty is to avoid unduly encroaching upon coal and water space.

Third-Class Sleeping Cars.

For many years suggestions that third-class sleeping accommodation should be provided on long-distance night trains have been put forward, and the topic has been raised in Parliament more than once. Usually, too, comparisons are made with methods which apply in other countries, though many of these are unfair, in that they do not compare like with like. For example, second class (not third class) abroad must usually be compared with our third class, and in many cases foreign second-class sleeping accommodation is confined to traffic of a kind for which we have no true correspondent, though had we the same conditions to meet, we should probably have had third-class sleeping equipment long ago. We gather, however, that the matter is now being seriously considered by the L.M.S., L.N.E. and Great Western companies, and this is supported by a statement issued on their behalf. Indeed, we understand that quite a number of schemes of this class were under consideration long before the subject received its recent revival. The idea in most general favour is the re-arrangement of corridor carriage compartments so that two lying-down berths can be provided on each side. This would mean that each compartment would accommodate four passengers against the six or eight seats normally provided. Probably this would be regarded as a paying load when traffic is not particularly heavy, but it remains to be seen whether it would not entail the duplication at other times of the more popular trains (on which the demand would be greatest), with only the small supplementary charges suggested to provide revenue to set against the increased cost thus entailed.

Garratt Locomotive in South Africa.

In sending a series of photographs showing locomotives of the Garratt type, though some of them were built by German firms and are, therefore, more correctly either Modified Fairlie or Modified Garratt designs, Mr. J. P. Brierley, writing from Johannesburg, makes some interesting remarks. Two of the photographs show 2-8-2 + 2-8-2 engines built by Maffei, of Munich, in 1927, and known as Class U. Two other views show generally corresponding engines built by Henschel in 1927, and known as Class HF. The fifth view, the only one reproduced,

Digitized by Google

shows one of the Garratt engines of 2-6-2 + 2-6-2 type, of Class GD, built by Beyer, Peacock & Co., and photographed at Greyville (Durban) shed. Mr. Brierley explains that all these classes, with several other British-built Garratt engines of various designs, are used on the north and south-coast lines from Durban, where steep gradients, sharp curves and light under-structures are common.

Unofficial Locomotive Nomenclature.

G.M.R. writes as follows :—" In the early days of locomotives each one was given a name—a practice no doubt derived from their rivals, the coaches. In those days there were seldom two alike, but later, when three or four or more similar engines were built, they were referred to collectively by the name given to the first of the class or, perhaps according to the main theme of nomenclature, e.g., ' Star ' class. Now I do not propose to refer to the official names, but think the study of nick-names is rather interesting. Nick-names are derived usually from some characteristic, either in performance or in appearance, or the class may be labelled with a name which was on the public tongue when the first engine came out. These three headings overlap to a certain extent. A good example of the first is the 2-4-2 tank engine of the L.N.E.R. (G.E. Section). The first 20 of these engines were built in 1883 by Mr. W. Worsdell and fitted with Joy's valve gear. Their appetite for coal was amazing, and ever since that date all engines of this type have been called ' Gobblers.' The 999 class of 0-6-0 goods engine (now scrapped) on the same section were referred to as ' Waterburys,' possibly because when running with steam shut off the motion made a noise which (with a stretch of imagination) resembled a clock. Engines of a somewhat larger class of the same type on the G.N. Section are called ' Knick-Knacks ' for a similar reason, whilst the corresponding class on the old G.C.R. were called ' Pom-Poms '—from the sound of their exhaust beats.

" In 1911, when ' Alexander's Rag-Time Band ' was on everyone's lips, a certain class of engine came out on the G.N.R. which had outside motion. Now, as this motion was outside, it made itself heard more than the older inside motion. Naturally the class was labelled ' Rag-timers.' This set the ball rolling. The coal engines which came out later were called ' Tango's,' and then we came to the ' Jazzers.' Possibly the new 3-cylinder 4-4-0's will be labelled the ' Charlestons ' or the ' Yale Blues.' Turning to generalities for a moment, North Eastern engines are usually referred to as ' Geordies,' and Great Eastern engines are dubbed ' Swedies,' both names, of course, being derived from the country they serve.

" Dealing next with the nick-names arising from characteristics of appearance, we get some weird flights of imagination. The G.C.R. Atlantics, built at the beginning of the present century, were considered so graceful that they are to this day referred

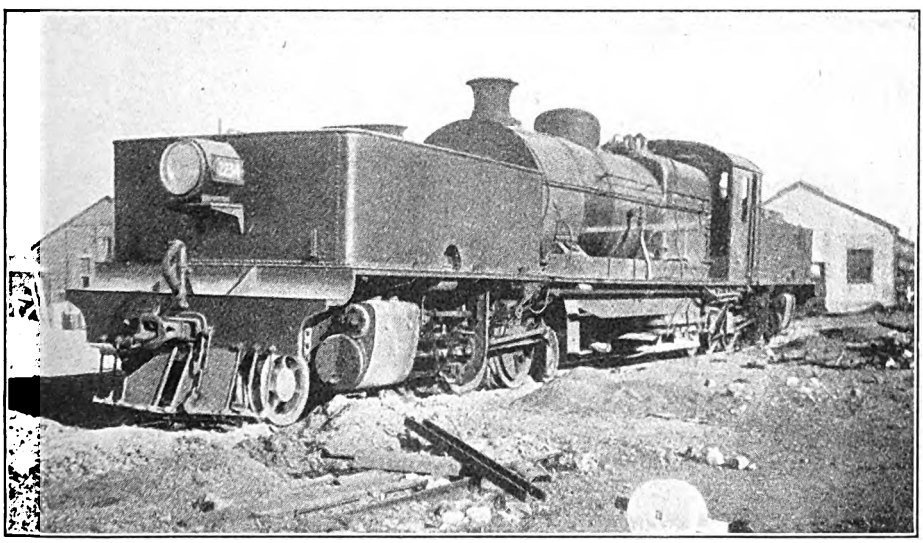


Photo.] [*J. P. Brierley.*

BRITISH-BUILT GARRATT LOCOMOTIVE AT GREYVILLE (DURBAN) SHED.

Digitized by Google

to as the 'Jersey Lilies,' after the celebrated Lily Langtry. Two classes of old 0-6-0 engines on the same railway were called 'Bashers' and 'Bulldogs' respectively, owing to their appearance, whilst the big 2-6-4 tanks are referred to as 'Crabs.' When the G.C.R. 2-8-0 class of engine (so widely known as the standard R.O.D.) was brought out, the first one seemed so large in comparison with the other engines that it was affectionately called 'Tiny,' a name which has remained, though the point is now rather lost.

"Then we have the third series in which a class of engine is labelled with the event of the year in which the first lot appeared. Although engine No. 990 on the G.N.R. was the first Atlantic in the British Isles, it and its successors answer to the name of 'Klondyke' because it came out in 1898. Another famous class suffers in a similar manner—the 0-6-0 passenger tanks of the G.E.R. were called 'Jubilees' owing to their having appeared in 1897. Incidentally, they are also referred to as 'Buckjumpers,' the reason for which is obvious.

"Besides the above, we have others on the border line. The famous 4-4-0's on the G.E.R. have always been known as the 'Claud's,' after the first engine of the class named 'Claud Hamilton.' This can hardly be called a nick-name—it is almost, one might say, the official name. No doubt many readers know of curious nick-names on other lines, and it would be interesting to hear them."

Scenes on Indian Railways.

WRITING from the Punjab (India), Mr. P. S. A. Berridge, an assistant bridge engineer on the North Western State Railway, sends two interesting photographs, which are reproduced. He also provides explanatory remarks as follow :—

The first shows the Punjab Limited Express (Bombay to Peshewar *via* G.I.P.) crossing the Jhelum Bridge on the occasion of its inaugural run on October 7, 8 and 9, 1927. This fine train is run for the exclusive use of passengers to and from Europe. The accommodation (first class only) is particularly luxurious, and the passengers have the further comfort of immunity from disturbance throughout their journey. The train consists of four bogie composite coaches, one bogie brake van, and one 12-wheel diner. On this particular occasion two of the composite coaches shared the same bogie, *i.e.*, Gresley's patent articulated coach, a feature which is now general on the L.N.E.R. in England. The coaches are painted cream, lettered in gold, and picked out in blue. The coaches belong to the G.I.P. Railway.

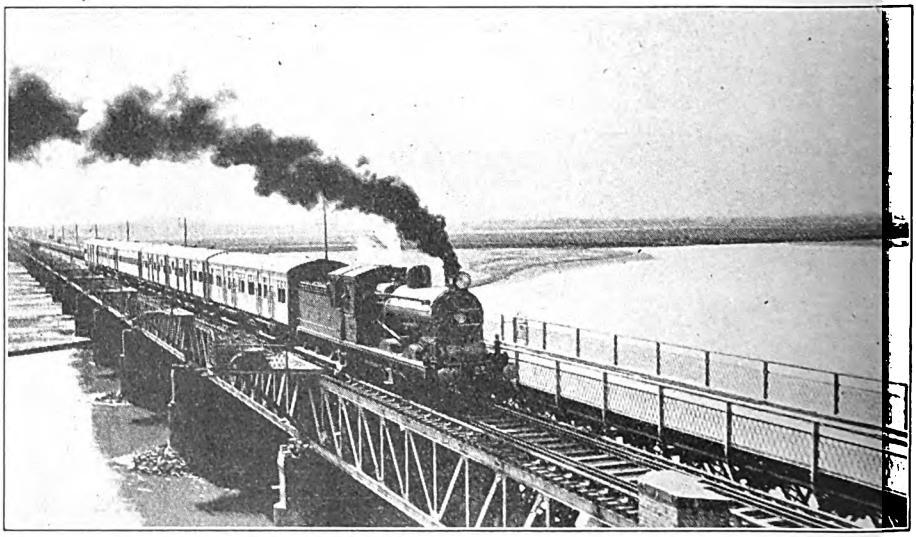


Photo.] [*P. S. A. Berridge.*

PUNJAB LIMITED EXPRESS CROSSING JHELUM BRIDGE.

Another feature of interest in this picture is the Jhelum Bridge. This structure consists of 50 spans 94-ft. 6-in. centres of bearings, and is now undergoing considerable strengthening. The original spans consisted of two N-type girders, braced together, carrying transverse trough decking. As rebuilt, each span will consist of three girders of the N type, braced together, and carrying

Digitized by Google

ie old trough decking and a ballasted road. his rebuilding is going on without any terruption to traffic with the exception of a peed restriction of 5 m.p.h. from end to nd of the bridge. The new spans are built p on temporary staging on the upstream de of the bridge. They consist of two of ie old girders considerably reinforced and ie new central girder. The work of moving an old span and rolling-in the new ne is done in under two hours, which is redit to the labour, consisting entirely of ndians. The other bridge in the picture is ne road bridge, which, when opened in 1872, arried the metre-gauge railway to its old rminus at Jhelum.

The second view shows the 7 up passenger rain from Kalka to Simla approaching the

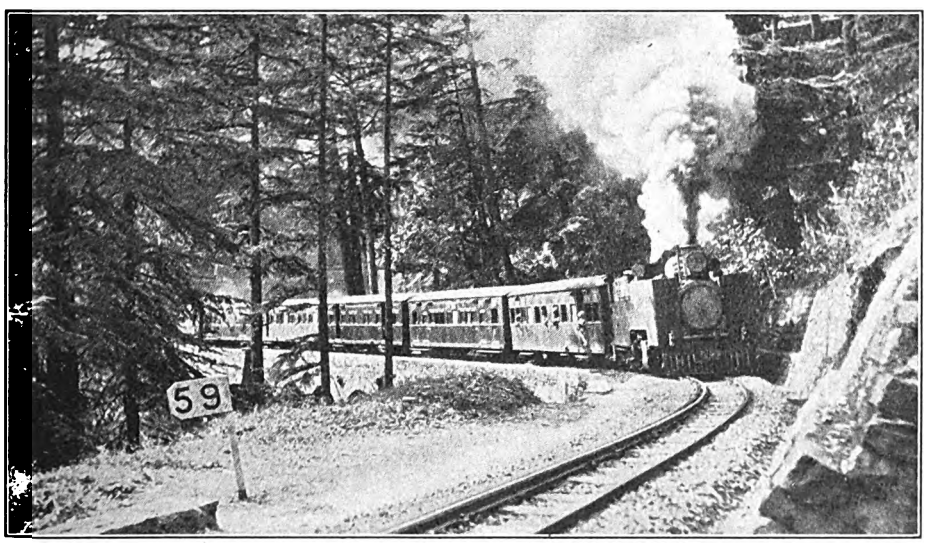


Photo.] [*P. S. A. Berridge.*

UP PASSENGER TRAIN FROM KALKA TO SIMLA.

ifty-ninth mile-post from Kalka. This railway, known as the Kalka–Simla Section of he N.W.R., is 2-ft. 6-in. gauge and is at present worked by 2-6-2 tank locomotives, as shown in the picture. These engines were built in Glasgow by the North British Locomotive Co. Ltd. and are all alike. There are, however, two Garratt-type locomotives on order from England. The line from Kalka is 59¾ miles long and is in itself a wonderful piece of engineering. There are 103 tunnels, one of which, at Barogh, is the second longest in India. Mail trains take 6 hr. 6 min. for the up journey, but this includes 25 min. stop at Barogh for refreshments. Rail motor-cars (petrol driven) take only 3 hr. 50 min. for the uphill run. Passengers travelling in these cars must pay an additional 5 rupees to their first-class fare. They are rewarded with the magnificent views and, of course, quicker transit.

Anniversary of the "Pennsylvania Limited."

NOVEMBER 19, 1927 was the forty-sixth anniversary of the inauguration of the famous American train now known as the "Pennsylvania Limited," and in honour of the occasion the company made special provisions on the 12.5 p.m. trip from New York, the chief of which was a large birthday cake, decorated with 46 candles. A special dinner served on the train included a piece of birthday cake for each passenger in the dining car, while souvenir menus giving the history of the "Limited," and decorated with a steel engraving of the train, were distributed.

The initial trip took place on November 19, 1881, at a period, we are reminded by the Pennsylvania Railroad, when "Chester A. Arthur was in the White House and Queen Victoria on the throne of England. The telephone was just being introduced in public use, while the automobile was as yet unheard of. The wheels of the 'Limited' were to roll seventeen years before the Declaration of War with Spain." The train was originally known as the "New York and Chicago Limited," its title conveying that its chief function was to provide express de luxe service between the commercial capitals of, respectively, the east and middle

Digitized by Google

west of the United States. It also carried through cars to St. Louis and Cincinnati, and provided through service between Philadelphia and the west and Washington and Chicago. In its original form it consisted entirely of elaborately decorated Pullman palace cars, including what were then called "hotel cars." The latter, with berths and drawing-rooms, served also as dining cars. The porters prepared and served meals à la carte or table d'hôte from car kitchens. Portable tables were fixed between the berths. After the first year of operation, regular dining-cars were added and the "hotel cars" were replaced by newer style sleeping cars. The running time between New York and Chicago at first was 26 hours and 35 minutes, or seven hours faster than any combination of trains previously operated between those cities.

In 1891 the name of the train was changed to the "Pennsylvania Limited," New vestibule cars of improved type were provided, interior furnishings and decorations were greatly improved, and smoking cars, writing desk, financial reports and many other luxuries of travel were added. The exterior was finished in cream and green colour, presenting a notable and striking appearance. Since 1907 the "Pennsylvania Limited" has been an exclusive all-steel train, finished in standard colour of Tuscan red, and representing a very high development in passenger equipment. During its 46 years of running the "Limited" has never missed a trip, but has been operated, without interruption, seven days in every week, both east and westbound. Allowing for leap years, it has therefore completed 33,235 one-way trips between New York and Chicago, representing a distance of approximately 30,000,000 miles. It is estimated that in this period it has carried more than 6,000,000 passengers.

The T.O.T. Philharmonic Society.

HAVING successfully produced no fewer than twelve of the Gilbert and Sullivan operas, the T.O.T. Philharmonic Society occasionally break away from that delightful series and present works by other well-known librettists and composers. They did this again when, at the New Scala Theatre, they produced that charming opera, "The Chocolate Soldier"—music by Oscar Straus, English libretto by Stanislaus Stange—giving five performances in all. Despite the fact that this exceedingly tuneful opera contains some very good character parts, it is seldom presented by amateurs. Be that as it may, the T.O.T. players have no reason to regret their decision to stage it, and both Mr. Emil Hardy, the producer, and Mr. C. F Lambert, the musical director, are heartily to be congratulated on the all-round success of their efforts. These gentlemen were well served both on the stage and in the orchestra. In the title-rôle, Mr. Alec Pleasance had a character after his own heart, and played it with the nicest possible sense of humour and discrimination. In this he was admirably seconded by Miss Doreen Howard, as Nadina, whose fine rendering of the famous "Hero" song aroused great and deserved enthusiasm. Miss Queenie Thomas was also well placed as Mascha and contributed not a little to the general enjoyment. Miss Roberta Labrom put in some good sound work as the middle-aged Aurelia.

Mr. Cyril Corker got quite a lot of fun out of the part of Colonel Popoff; and very quaint and amusing was Mr. Ralph Harlow as the peppery Captain Massakroff. Quite good, too, was Mr. Thomas Dean as the conceited Alexius. The minor parts of Stephan and Katinka were well sustained by Mr. William McIsack and Miss Winifred Hayward respectively. The Slav dance (arranged by Miss Chrissy B. Neville) and the appearance of the stage band (members of the T.O.T. Military Band) in the second act were much-appreciated features of a truly notable production.

Standard Advertising of Railway Facilities.

AN interesting development in regard to the systemisation of railway advertising has been introduced by Mr. J. Blumenfeld Elliot, Assistant to the General Manager for Public Relations and Advertising, Southern Railway. This consists in the use of panel advertisements published regularly in local papers of all cheap ticket facilities applying to the locality, with the trains by which they are available. These announcements appear, by arrangement, as far as possible on the same page and in the same position each week, so that readers may know just where to look for the desired information, in much the way as they look for theatre information in the London newspapers. The fact that complete train particulars are associated with information as to fares, &c., and that the matter has been standardised in form, position and regularity of publication, is believed to inaugurate a new feature in railway advertising, while the policy is one that has a great deal to commend it. The specimens which have come under our notice are neatly designed, in panels, with five vertical columns setting forth, respectively: (1) daily or particular week-day trains; (2) week-day fare; (3) destination stations; (4) Sunday fare (this is only occasionally different); and (5) Sunday trains. Special announcements are given at the foot as desirable.

Digitized by Google

WHAT THE RAILWAYS ARE DOING.

L.M.S.R. APPOINTMENTS.

WE are officially informed of the following appointments :—

Chief Engineer's Department.

Mr. E. Prebble, District Engineer, Watford, to be Assistant Engineer (Permanent Way), Euston.

Mr. A. Wood-Hill to succeed Mr. Prebble as District Engineer, Watford.

Chief General Superintendent's Department.

Mr. T. H. Wakefield is appointed District Controller, Westhouses and Blackwell.

Mr. T. E. Fitton is appointed Parcel Agent, Manchester (Victoria, London Road, Exchange and Central).

Mr. J. Clayton becomes Passenger Agent, Manchester (Victoria and Exchange).

Mr. R. Sumner, Stationmaster, Hindley, is appointed Stationmaster, Sowerby Bridge.

Chief Goods Manager's Department.

Mr. F. R. Kitton is appointed Horse Superintendent, Glasgow.

Mr. H. A. Turner is appointed District Horse Superintendent, Manchester.

* * *

MR. ARTHUR SILVESTER MATTHEWS, who has been appointed by the Directors of the Central Argentine Railway Limited to be Assistant Secretary of the company as from March 1, was educated at Cheam School, Eton, and Magdalene College, Cambridge, where he took an honours degree in mathematics. He received a temporary commission in the 13th Reserve Cavalry Regiment in August, 1914, and served in France with the 8th (King's Royal Irish) Hussars from May, 1916, to February, 1919. Mr. Matthews was called to the Bar in May, 1919, and would have been called earlier but for the outbreak of war. He unsuccessfully contested the Doncaster Division of the West Riding of Yorkshire in 1924 in the Conservative interest. In February-September, 1927, he carried out a special mission to Colombia, Peru and Ecuador. Mr. Matthews is going to Spain for a couple of months and, after a few weeks in the London office, will proceed to Argentina to acquire a close knowledge of the company's property and affairs.

[*Vandyk.*

MR. A. S. MATTHEWS,
Appointed Assistant Secretary, Central Argentine Railway.

* * *

MR. A. E. SEWELL, who has been appointed to the position of Assistant Goods Manager, Southern Area, L.N.E.R., in succession to Mr. H. Ferguson, has held the position of Rates Assistant to the Goods Manager, North Eastern Area, since August, 1923. Mr. Sewell was born at Whitby, and was educated at Ackworth School and at Bootham School, York. He joined the North Eastern Railway Company towards the end of 1903, and, after gaining experience in various departments, was transferred to the General Manager's office in 1907. In 1912 he became a travelling Parcels Supervisor attached to the Passenger Manager's office, and later was appointed to take charge of the parcels section of that office. In 1915 Mr. Sewell was transferred to the Chief Goods Manager's office, where he controlled the wagon demur-

Digitized by Google

Digitized by Google

rage section, and was also responsible for the traffic restriction arrangements which were a special feature of the war period. In 1919 he was promoted to the Rates Office at York, of which he ultimately took charge. From July, 1921, to April, 1922, he was released to act as Secretary to the Committee of Goods and Mineral Managers of the "Eastern Group Companies," which was appointed to co-ordinate the arrangements of the seven component companies in anticipation of amalgamation. Mr. Sewell is well known at the Railway Clearing House, which he has attended regularly since 1915.

* * *

MR. S. A. V. GREGORY, who has been appointed District Passenger Manager, London, L.N.E.R., in succession to Mr. C. G. Dandridge, has held the position of Assistant to the London District Passenger Manager since March 1926. He entered Great Northern Railway service in the London District Goods Superintendent's office at King's Cross in September, 1892, and in July, 1898, was transferred to the London District Goods Manager's Department. In June, 1902, in connection with departmental reorganisation involving the separation of the operating and commercial departments, he was appointed Chief Clerk to the Assistant Divisional Superintendent at King's Cross and in January, 1911, became Chief Clerk to the London Goods Superintendent, with the subsequent appointment in January, 1921, as Outdoor Assistant to the London District Manager.

* * *

MR. G. SUTHERLAND, who has been appointed to succeed Mr. J. Procter Smith as Divisional Accountant, Southern Area, L.N.E.R., as from March 1, commenced his railway service in the Audit Office of the Highland Railway at Inverness in September, 1895. From July, 1905, he was in charge of Locomotive Accounts, under the Accountant of the Highland Railway. In March, 1913, he was appointed an Examiner of Departmental Accounts under Mr. Martin, General Accountant of the North British Railway. From January, 1920, to January, 1921, his services were lent to the Ministry of Transport as Accountant to the Director-General of Civil Engineering. He then returned to Edinburgh, remaining there until March, 1923, when he was transferred to London, on the formation of the L.N.E.R., as Special Auditor under Mr. C. L. Edwards, appointed Chief Accountant, L.N.E.R. In May, 1925, Mr. Sutherland was appointed Assistant to the Chief Accountant.

MR. RICHARD BROWN, who has been appointed Assistant to the Chief Accountant, L.N.E.R., as from March 1, is a native of Newcastle-on-Tyne. He entered the Accountant's office of the North Eastern Railway in 1895, and 12 years later was appointed to take charge of a department which included the accountancy work of the Servants' Pension Society, then recently formed. Subsequently, the accounts of other N.E.R. societies and matters connected with National Insurance were placed under Mr. Brown's control. During 1921 and 1922 Mr. Brown acted as Secretary of the Committee of Accountants of the Constituent Companies of the L.N.E.R. appointed to deal with accountancy matters preparatory to the amalgamation of the railways under the Railways Act, 1921, and was responsible for the production of the financial and statistical information for the Committee. Mr. Brown took an active interest in the formation of the N.E.R. Cottage Homes Fund, and served for several years on the Committee of the Fund. In the early part of 1923, Mr. Brown was transferred to the headquarters of the L.N.E.R. at King's Cross as General Assistant to the Chief Accountant, and has been actively engaged in the many schemes of reorganisation, particularly in relation to the unification of accounting methods and the standardisation of forms and books.

* * *

L.M.S.R. APPOINTMENTS.

THE following appointments have been authorised by the directors :—

Carriage and Wagon Department.

Mr. J. Purves to be Divisional Carriage and Wagon Superintendent, Wolverton, *vice* Mr. C. L. Mason, resigned.

Mr. E. G. Oliver to be Chief Outdoor Assistant, Derby, *vice* Mr. Purves.

Mr. F. S. Barnes to be Outdoor Assistant, London.

Mr. A. Briers to be Outdoor Assistant, Manchester.

Mr. R. Hornbuckle to be Technical Assistant to Carriage and Wagon Superintendent, Derby.

Solicitor's Department.

Mr. W. F. Yates to be Divisional Solicitor, Manchester.

Chief General Superintendent's Department, District Locomotive Superintendents.

Mr. F. C. Anker transferred to Nottingham, *vice* Mr. F. E. M. Donne, retired.

Mr. A. E. Bolderston transferred to Wellingboro'.

Digitized by Google

Mr. P. McCallum transferred to Crewe.

Mr. E. K. Carey transferred to Sheffield.

Mr. G. H. Nelson transferred to Bletchley *vice* Mr. W. H. Dibb, retired.

Mr. S. W. Hynd transferred to St. Rollox (Glasgow), *vice* Mr. J. Liddell, retired.

Mr. E. L. Booth transferred to Carlisle district.

Mr. J. J. P. Sheridan transferred to Low Moor.

Mr. T. F. Whitehead transferred to Preston.

Mr. W. Y. Shawcross appointed Spare District Locomotive Superintendent, Derby.

Mr. E. A. Parnell has been appointed District Controller, Masboro'.

Overseas and Continental Traffic Manager's Department.

Mr. T. D. Slattery, of Derby, is appointed Travelling Representative, New York.

* * *

L.N.E.R. APPOINTMENTS.

WE are officially advised that the following appointments have been made by the Directors :—

Mr. T. H. Seaton, District Engineer at Leeds, to be District Engineer at Stratford, in succession to Mr. V. A. M. Robertson, who is resigning in order to take up the position of Civil Engineer to the London Underground Railways.

Mr. S. A. V. Gregory, Assistant to the District Passenger Manager, London, to be District Passenger Manager, London, in succession to Mr. C. G. Dandridge.

Mr. R. R. Pettit, Assistant to the District Passenger Manager, London, to be Assistant District Passenger Manager, London.

In connection with the recent appointment of Mr. A. E. Sewell, Rates Assistant to the Goods Manager, North Eastern Area, to be Assistant Goods Manager, Southern Area, Mr. J. W. Dyson, who has had charge of the Rates Revision Section at York, has been appointed to take charge of the combined General Goods Rates and Revision Offices, with his present title of Rates Assistant to the Goods Manager.

Mr. K. P. Walker, Assistant District Goods Manager, Newcastle, to be Assistant to the Superintendent (Staff), North Eastern Area, in succession to Mr. W. E. Blakey.

In connection with the transfer to Gateshead of Mr. G. P. Benzie, who formerly occupied the dual position of Stores Superintendent and Factor for the North Scottish Area, and the death in August last of Mr. J. Cunningham, Factor for the Western Division of the Southern Scottish Area, a reorganisation of the Factorage work in Scotland has been carried out, and Mr. J. Hay, at present Factor for the North, East and South Divisions of the Southern Scottish Area, has been appointed Factor (Scotland) with headquarters at Edinburgh.

* * *

ON February 14 a meeting was held in Edinburgh to inaugurate a Scottish section of the Institute of Transport. Mr. E. G. Guest presided, and was supported by Mr. Roger T. Smith, President of the Institute, and others. After a speech by the President and a general discussion, a resolution was passed "that a Scottish section of the Institute of Transport be formed, and that meetings be held alternately at Edinburgh, Glasgow, and in other parts of Scotland."

* * *

FOR the first time since it was built 51 years ago the L.M.S. bridge over the Clyde at Central Station, Glasgow, has been closed to traffic. The bridge measures 730 ft. in length and 53 ft. in width, and to effect the necessary repairs 750 cubic yards of concrete, equal in weight to 1,200 tons, are being used as a flooring. So that the lines could be available for traffic at the earliest possible moment gangs of men have been working day and night.

* * *

THE 66th Annual General Meeting of the Great Western Railway Literary Society was held at Paddington on February 6. The membership during 1927 was 754, an increase of 51 over the previous year. This Society is the oldest Great Western institution in existence, having been established in the year 1852. There are 13,000 books in its library.

* * *

IN the course of a tour in the Midlands the Prince of Wales visited the L.M.S.R. works at Derby on February 22. He was accompanied on his visit by Sir Josiah Stamp, President, L.M.S.R., Mr. R. W. Reid, Vice-President, Sir Henry Fowler, Chief Mechanical Engineer, and Mr. E. J. H. Lemon, Carriage and Wagon Superintendent. The Locomotive Works at Derby occupy an area of about 80 acres, of which 20 acres, including the Stores Department, are covered by shops and offices. Approximately 4,500 men and youths are employed in the works

Digitized by Google

when they are working to capacity. The Carriage and Wagon Works cover an area of 128 acres, the covered area being 36 acres in extent. 5,250 males and 330 females are employed, mess-room accommodation being provided for 2,000 persons. In these shops wagons are assembled in 30 minutes and carriages in 20 minutes.

* * *

THE death is announced, at Ottawa, of Mr. Charles E. E. Ussher, General Passenger Traffic Manager of the Canadian Pacific Railway, who was born at Niagara Falls, Ontario, in 1857.

* * *

AN interesting ceremony took place on February 16 at the French Embassy, when Lord Dalziel of Wooler was presented by the French Ambassador, on behalf of the French President, with the insignia of Grand Officer of the Legion of Honour, this being the highest grade to which a civilian is admitted. A photograph of the ceremony is reproduced herewith. Lord Dalziel already holds a high distinction in the Order of the Crown of Italy.

* * *

THE Minister of Transport has recently made the following Order:—The Easingwold Light Railway Order, 1928, authorising the working of the Easingwold Railway as a light railway under the Light Railways Act, 1896 and 1912, as amended by the Railways Act, 1921.

* * *

THERE was a well-attended meeting of the Permanent Way Institution, Sheffield Section, on February 14, when Mr. C. Travis, M.Inst.T., Associate Editor, *The Railway Gazette*, delivered a lecture on "Permanent Way and Works in Australasia," illustrated by lantern slides. Mr. W. B. Pickering, Director, Hadfield's Limited, who has visited both Australia and New Zealand, occupied the chair.

* * *

THE 5.55 p.m. Liverpool express from Euston and the 9.45 a.m. express from Liverpool to London are now known as "The Merseyside Express." Berkswell station has been renamed Berkswell and Balsall Common.

* * *

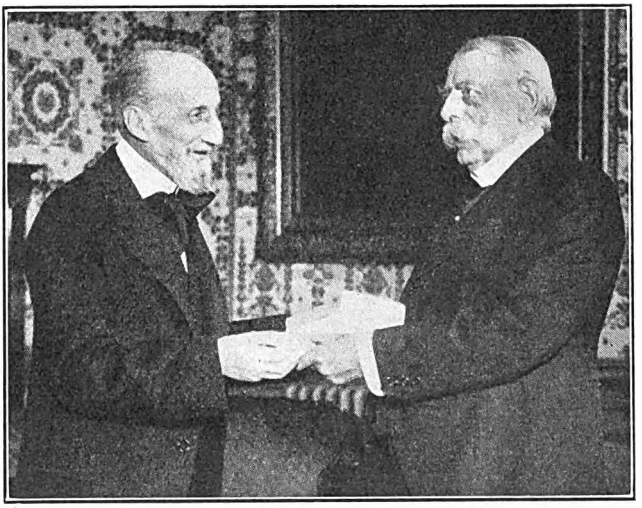
OVER 23,000 people inspected the *Royal Scot* engine when on exhibition at Manchester. Manchester thus has the record attendance amongst the 14 towns the *Royal Scot* has so far visited.

* * *

LIEUT.-COLONEL THE RIGHT HON. LORD AILWYN, D.S.O., M.C., Honingham, Norwich, and Sir Christopher Thomas Needham, Fair Oak, West Didsbury, Lancs, have been appointed directors of the L.N.E.R. in place of Mr. Edward Gurney Buxton, resigned, and the late Sir Arthur Pease, Bart.

* * *

THE directors of the Isle of Man Railway Company in their annual report state that Mr. Arthur Binns Crookall, J.P., M.H.K., of Douglas, has been appointed a member of the Board in place of Mr. E. T. Kissack, who had resigned for reasons of health. They add that Mr. Thomas Stowell, who has held office in the company for 53 years, first as Chief Clerk and Accountant and then as Secretary and Manager, having retired, they have appointed Mr. Allan Mylchreest Sheard, their late Chief Clerk and Accountant, to the position of Secretary and Manager.



THE FRENCH AMBASSADOR PRESENTING LORD DALZIEL OF WOOLER WITH THE INSIGNIA OF GRAND OFFICER OF THE LEGION OF HONOUR.

* * *

WE regret to hear of the death, at the age of 83, of Mr. Joseph Morris, Superintendent of the Line, Great Western Railway, 1904-10.

* * *

THE Minister of Transport has recently made the following Order:—Basingstoke and Alton Light Railway (Amendment)

Digitized by Google

Order, 1928, amending the Basingstoke and Alton Light Railway (Amendment) Order, 1900.

* * *

THE Lord Chancellor has nominated Mr. Justice Salter to be ex-officio Commissioner for England under the Railway and Canal Traffic Act, 1888, in succession to Lord Justice Sankey.

* * *

THERE was an excellent attendance in the Lecture Hall of the York Railway Institute on February 29, when Mr. C. Travis, M.Inst.T., Associate Editor, *The Railway Gazette*, delivered a lecture, illustrated by lantern slides, on "A Tour Round the World." Mr. J. Miller, B.E., LL.D., Engineer, North Eastern Area, L.N.E.R., presided. The lecture covered a tour of 60,000 miles, recently made by Mr. Travis through France, Italy, Egypt, Ceylon, Australia, New Zealand, the South Sea Islands, Canada and the United States, and included many incidental references to the railways on which he travelled.

* * *

THERE was a large attendance at the meeting of the London Section of the Permanent Way Institution at Waterloo station on February 23 to hear a lecture on "The Railways of South America—with Special Reference to Permanent Way and Works,' by Mr. C. Travis, Associate Editor, the *Railway Gazette*. Mr. A. Newlands, Chief Engineer, L.M.S.R., was in the chair.

* * *

THE WIMBLEDON MODEL RAILWAY CLUB.—Fixtures for April include :—April 2, test track, rummage sale and monthly competitions, and a chat on "Railway Hoardings and Field Signs" by Mr. R. F. Ritson of Messrs. Sells Limited ; April 16, lecture on "Some Further Developments at New Romney," by Mr. H. Greenly ; April 26, All-day visit to Swindon, G.W.R. Full particulars of the club, entry forms and any other desired information can be obtained from the hon. secretary, 27, Bernard Gardens, S.W.19.

* * *

AN order has been placed by the L.N.E.R. for 20 additional Sentinel-Cammell steam rail coaches. These, together with 20 of the same type already on order, and 10 of Clayton type, will bring the fleet for which arrangements have so far been made to 50.

* * *

THE Westinghouse Brake & Saxby Signal Co. Ltd. write : "Cable advice has been received from South Africa that the all-electric signalling installation at Cape Town was successfully brought into operation on Sunday, February 26. The official order for this work, the first installation of its kind in South Africa, was received by the Westinghouse Brake & Saxby Signal Co. Ltd. in January, 1927, and all the apparatus was manufactured and shipped in time for the installation to be opened within fourteen months from receipt of order."

* * *

THE Westinghouse Brake & Saxby Signal Co. Ltd. have received an order from the Southern Railway Company for signalling apparatus for the Southern Railway Lewisham connecting lines.

* * *

THE Siemens & General Electric Railway Signal Co. Ltd. write : "We are pleased to inform you that orders have been placed with this company for the supply of the whole of the four-aspect colour light signals, A.C. and D.C. power point machines and equipment, lever locks, catch handle contacts, lever contact makers and signal repeating apparatus ; also certain A.C. track circuit equipment and impedance bonds which will be installed on the Lewisham connecting lines, Southern Railway."

* * *

COMMENCING on Monday, March 12, the L.N.E.R. introduced more cut fares on local branches in the North Eastern Area of their system. The reductions are extensive, in some cases representing as much as 57 per cent. The new type of steam rail coach was introduced concurrently in the Hull area, serving the Hull, Beverley, Goole, Hornsea, Withernsea and South Howden branches. This new train-unit enables the L.N.E.R. to supplement the present time-table in this district by 20 new additional services.

* * *

HAMWORTHY Junction Station, Southern Railway will be reopened on Sundays as from Easter Sunday, April 8, and a number of trains will be booked to call.

* * *

IT is now officially announced that the steamship service between Fleetwood and Belfast in both directions will cease after Saturday night, April 28. Commencing on Monday night, April 30, the steamships will commence to run between Heysham and Belfast, and the boat trains in connection will be correspondingly altered. Further details are to be announced later.

Digitized by Google

THE accompanying illustration is a reproduction, in miniature, of the somewhat unique 16-sheet poster which the London & North Eastern Railway Company is issuing in conjunction with the Flushing Line. To be appreciated to the full, the poster itself must be seen, as the illustration most certainly does not convey anything like an adequate idea of its merits. It is carried out in red, blue and black, with an ingenious arrangement of the lettering. The poster has been designed by Mons. A. Mouron Cassandre, the famous French poster artist, whose work has been very much in the forefront in poster art circles. Although travellers in France and other parts of the Continent are familiar with the work of this artist, very few of his posters have so far been seen in this country.

* * *

So large an attendance has not been known for many years past as that which met on the occasion of the annual general meeting of the Railway Club at the Tothill Street premises on February 20. After the formal business had been disposed of, the President, Mr. Cecil J. Allen, varied the usual form of his Presidential Address by giving an illustrated lecture on "The Remarkable Railway Engineering of Switzerland." The magnificent series of lantern slides exhibited dealt first with the engineering of such main routes as the St. Gotthard and the Lotschberg, with the spiral planning by means of which the railways have maintained an even grade despite abrupt changes in the levels of the valley floors. From these Mr. Allen proceeded to the narrow-gauge lines, devoting special attention to the Rhaetian and Bernina systems, and the lecture concluded with a description of the rack-and-pinion and cable-operated funicular railways. An animated discussion brought to a close what was admitted by all to have been a very enjoyable evening.

* * *

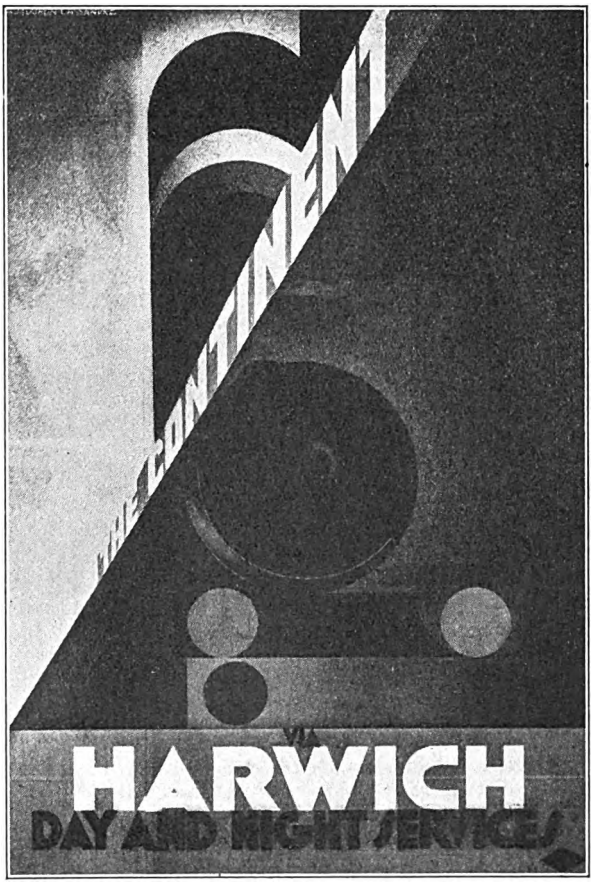
The Annual Model Railway Club Exhibition will be held at Kingsway Hall, London, April 18-21.

* * *

THE L.N.E.R. has placed an order with Beyer, Peacock & Co. Ltd. for ten 4-6-0 tender locomotives, of the Great Eastern section type. These locomotives, which have inside cylinders, are to be fitted with Lentz poppet valves. Ten 4-6-0 locomotives on order with the North British Locomotive Co. Ltd. will have three cylinders and piston valves.

* * *

SIR W. G. ARMSTRONG, WHITWORTH & CO. LTD. have received an order from the Great Western Railway for the supply of 50 0-6-2 type superheated tank locomotives. These will be built at the Scotswood works of Sir W. G. Armstrong, Whitworth & Co. Ltd., and will be completed before the end of the year.



NEW L.N.E.R. POSTER ADVERTISING CONTINENTAL SERVICES.

* * *

THE Crown Agents for the Colonies have placed contracts with Robert Stephenson & Co. Ltd. for five 2-6-4 tank engines for the Ceylon Government Railways, and for six 4-8-0 tender locomotives for the Nigerian Railways.

Digitized by Google

Under this heading will be inserted short references to news items relating to locomotive engines and their duties. It must be understood, however, that information as to the stations of particular engines cannot be given, for the reason that, before the date of publication, transfers may have taken place, while lists of engines, &c., debarred from "The Why and the Wherefore" section, cannot be included under this heading. With this understanding, notes as to matters thought to be of general interest will be welcomed.

L.M.S.R.

NUMBERS of locomotives of each wheel-type owned at the end of 1927 were :—Tender engines, 4 (4-2-2) 35 (0-4-2), 249 (2-4-0), 1,192 (4-4-0), 26 (4-4-2), 3,541 (0-6-0), 116 (2-6-0), 911 (4-6-0), 801 (0-8-0), 44 (2-8-0), 1 (0-10-0), total, 6,920 ; tank engines, 120, (0-4-0), 370 (0-4-4), 20 (2-4-0), 53 (4-4-0) 23 (0-4-2), 516 (2-4-2), 157 (4-4-2), 1,267 (0-6-0), 454 (0-6-2), 64 (0-6-4), 6 (2-6-4), 59 (4-6-2), 29 (4-6-4), 6 (0-8-0), 31 (0-8-2), 30 (0-8-4), total, 3,205. Also 3 (2-6-0-0-6-2) Garratt engines. Total, 10,128. Further items : 37 steam rail motor cars ; two electric locomotives ; 301 electric motor cars ; 405 electric trailer cars ; 27,214 passenger coaching vehicles for steam trains ; 305,898 merchandise and mineral vehicles ; 22,033 service vehicles ; 48 departmental locomotives.—[J. F. G.]

Garratt engine No. 4998 was noted at Brent on up coal train of 70 wagons with dynamometer car.—[G. H. SCOPES.]

"Claughton" engines Nos. 5992-5998, formerly at Edge Hill, Liverpool, have gone to Preston. 4-6-0 No. 6145 was on view at Exchange station, Liverpool, January 30 to February 4.—[T. M. BURGESS.]

Compound 4-4-0's Nos. 1197 and 1199 (Newton Heath) have been noted on Liverpool and Manchester-York and Newcastle trains. New 2-6-4T Nos. 2303-4 are at Manningham. Nos. 2305-6-7 are expected here also.—[H. SCOTT.]

Cal. 0-4-0ST No. 16005 was still shunting at St. Rollox Works in January, though stated to have been withdrawn. New 0-6-0's Nos. 4312-4317 are at Perth (Highland) shed. No. 4321 is at Corkerhill, and works on G. and S.W. Section. 2-6-0 No. 13097 was recently at Perth for bridge tests on the Highland main line. 4-6-0's Nos. 14750 (C.R. 49), 14752 (C.R. 903 *Cardean*), and 14637 have also been noted at Perth. Old Oban bogies Nos. 14100 and 14105 have been at Dundee, and No. 14103 at Stirling.—["GLASWEGIAN."]

C.R. 4-6-0 No. 14637 and 4-4-0 No. 14351 recently worked on an all-Pullman football special between Edinburgh and Glasgow.—[J. A. HODGE.]

Compound 4-4-0 No. 1157, reported as working to Preston and Windermere, was noted at London Road, Manchester, on a West of England express, with its correct tender.—["MOONSTONE."]

"Royal Scot" 4-6-0 No. 6129 is named *Comet*.—[J. F. MCEWAN and J. M. GIBB.]

"Claughton" 4-6-0 No. 5926 has been fitted with a reduced chimney. "Royal Scot" 4-6-0 No. 6102 is named *Black Watch*.—[A. STANIFORD.]

"Royal Scot" 4-6-0 No. 6113, named *Cameronian*, recently worked the 9.30 p.m. Manchester (London Road)-Crewe semi-fast train. This train is worked by widely-varied engines, though all come from Crewe. L. and Y. 2-4-2T Nos. 10901-2 are working suburban trains between Manchester (Central), Cheadle Heath and Stockport (T.D.). Nos. 10918 and 10932 previously worked on this service.—[R. DYSON.]

The Royal train conveying the King and Queen to visit the British Industries Fair at West Bromwich, Birmingham, on February 23, was worked by compound 4-4-0 No. 1076.—[F. V. W.]

Digitized by Google

"Royal Scot" locomotive No. 6145 *Condor* was shown in No. 8 Bay at Crewe on February 23-25. Compound 4-4-0's noted on trains between Crewe and Shrewsbury include Nos. 1052, 1056, 1079, 1080-1-2-3-4, 1110-1-2-5-7-9, 1120-1-2-4-6-7-8, 1131, 1151, and 1183.—["MIDLAND COMPOUND, NANTWICH."]

Midland 2-4-0 No. 251, rebuilt with Belpaire firebox, &c., is now at Manningham shed. 4-4-0 No. 450 is at Lancaster. 2-6-4T Nos. 2304-5 are at Manningham, but No. 2303 is sub-shedded at Ilkley for working the morning Club Train to Bradford. Compound 4-4-0's at Leeds include Nos. 1000-1013 inclusive, 1064, 1070-1-2, and 1085-6-7-8. Nos. 13050-13056 (2-6-0's) are also here. A number of engines actually shedded at Manningham (29), Keighley (29), Ilkley (29), and Skipton (30) are carrying Leeds (28) shed plates. New 0-6-0T No. 16551 is at Keighley. L. and Y. class 4-6-0's Nos. 10456-7-8 are now working from Newton Heath, Manchester. Midland 4-4-0 No. 741 is now at Newton Heath, and works chiefly to Preston. Passenger locomotives at Low Moor (2), Bradford, include :—"Prince" 4-6-0's Nos. 5838-5841 ; 2-6-0's Nos. 13015-6-9, and 13022-3 ; L. and Y. four-cylinder 4-6-0's Nos. 1522, 1524, 10406, 10412-3, and 10442 ; L. and Y. 4-4-2's Nos. 1404, 1407, 10305, 10310, 10315, 10321, and 10323 ; compound 4-4-0's Nos. 1185-6-7-8. No. 1189 is also expected. Other engines of this class are allocated :—Southport, Nos. 1190-1-2-3 ; Blackpool, Nos. 1194-5-6-7 ; York, Nos. 1198-9 ; Northern Division, Nos. 900-924 ; Nottingham (Mid.), Nos. 925-6-7 ; Leicester (Mid), Nos. 928-9 and 930 ; Derby, Nos. 931-2-3 ; Carlisle (Mid), Nos. 932-3-4. L. and Y. 2-4-2T engines on L.N.W. section include Nos. 10829 at Faverley Junction and 10841 at Huddersfield. Midland 4-4-0 No. 388 has been carrying both L.N.W. 29 shed plate and Mid. 25 shed plate, with Sheffield on the lamps. It is stationed at Carlisle (L.N.W.), and works between Carlisle and Carnforth *via* Whitehaven. Furness 4-4-0 No. 10140 was noted recently on L.N.W. local to Morecambe. Furness section engines now work all Midland traffic to and from Carnforth on Sundays.—[A. P. HERBERT.]

2-6-4T Nos. 2310-1 are at Manchester (16) shed.—[G. BECKETT and R. L. BOWES.]

4-6-4T No. 2106 has been working from Longsight shed, and L. & Y. 2-4-2T Nos. 10901-2 from Trafford Park, Manchester. 4-6-4T Nos. 11115-6 have presumably returned to Manchester ; also No. 11118.—[P. M. ALEXANDER and G. C. WILSON.]

With reference to No. 17922, mentioned as a Caledonian, section 0-8-0, withdrawn from service and corrected, last month, as a Highland 4-6-0, built 1919, the numbers and classes of neither of these are correct. 17922 is a Highland "Jones Goods" 4-6-0, built 1894 by Sharp, Stewart & Co., works No. 4028 (old H.R. No. 109). The Caledonian section 0-8-0's are numbered 17990–17997, and the Highland 4-6-0's, built in 1919 by Hawthorn, Leslie & Co., are numbered 17950–17957.—["DUNALASTAIR" and "CARDEAN."]

New 0-6-0 shunting tanks ex Vulcan Foundry are in traffic up to No. 16584. Two further series of the same type from other makers are also in course of delivery. Of these, the following are at work :—Nos. 16600-9 ex Beardmores and Nos. 16640-1 ex Hunslet Company. No. 2310, the first of a series of 2-6-4 passenger tank engines ex Derby, is at present working trial trips between Crewe and Warrington. Nos. 4449-56 are the latest class of goods engines to be completed and turned out at Crewe. The following 4-6-0 "Royal Scot" class locomotives have recently been named as shown :—No. 6102, *Black Watch*, No. 6110, *Grenadier Guardsman*, No. 6113, *Cameronian*, No. 6126, *Sanspariel*, No. 6134, *Atlas*, No. 6139, *Ajax*, and No. 6145, *Condor*. This latter engine was on exhibition at Crewe, February 23-25, when 4,184 persons paid for admission to view it in the enclosure in No. 8 Bay. The name-plates of No. 6145 have a crimson background, all others being finished black. Engines Nos. 6124-49 have been allotted names after early historic locomotives.

The following engines, late "D" and "G" classes, have recently been converted to class "G 1" (superheater) :—Nos. 1401, 1540, 1556, 1609, 1802, 1819, 1822, 1846, 1853, 1854, 1874, 1877, 1878, 1880, 2526, 2536. 2539, 2540, 2547, 2548. In the same order, these engines are now L.M.S. Nos. 9075. 9111, 9094, 9112, 9016, 9058, 9005, 9059, 9036, 9023, 9054, 9046, 9024, 9037, 9043, 9033, 9031, 9020, 9012, 9004. Three ex L.N.W. service vehicles were withdrawn from service during 1927, viz., *Engineer Manchester* and *Engineer Northampton* (both of the 6-ft. S.L. class) and No. 3087 (a 4-ft. shunter). Recent withdrawals include "Renown" class Nos. 1933 *Barfleur* and 5148 *Orion* ; "Precursor" class No. 5191 *Archimedes* ; "Precedent" class No. 5013 *Pioneer*, and "Waterloo" class No. 934 *North Star*.—[C. WILLIAMS.]

L.N.E.R.

The following particulars show the numbers of locomotives of each wheel type in service at the end of 1927 :—Tender engines : 57 (4-6-2), 305 (4-6-0), 239 (4-4-2), 885

Digitized by Google

(4-4-0), 2 (2-8-2), 418 (2-8-0), 145 (2-6-0), 96 (2-4-0), 378 (0-8-0), 2222 (0-6-0), total, 4747. Tank engines, 15 (4-8-0), 74 (4-6-2) 45 (4-4-4), 163 (4-4-2), 15 (4-4-0), 20 (2-6-4), 313 (2-4-2), 4 (2-2-4), 4 (0-8-4), 36 (0-8-2), 9 (0-6-4), 678 (0-6-2), 1014 (0-6-0), 201 (0-4-4), 4 (0-4-2), 80 (0-4-0), total 2,675; also the Garratt (2-8-8-2), 1 electric (4-6-4), 12 electric (0-4-4-0), 2 petrol shunting engines, grand total 7,438. Miscellaneous items: rail motor cars, 5 steam, 1 petrol, 3 petrol-electric; 70 electric motor-cars, 55 electric trailer cars, 16 electric tramcars; 20,214 passenger coaches for steam trains and 93 jointly owned; 278,710 merchandise and mineral vehicles; 16,415 service vehicles, and 14 departmental steam locomotives and 3 departmental petrol rail motors.—[J. F. G.]

New 0-6-2T Nos. 2634 and 2637 have been working trains from Manchester, London Road. G.E. 4-6-0's Nos. 8555, 8557 and 8561 have worked the Harwich Continental express to and from Manchester (Central).—[R. DYSON.]

The special train from Edinburgh to St. Boswell's for Earl Haig's funeral, was worked by 4-4-0, No. 9417, *Cuddie Headrigg*, and 4-4-2 No. 9903, *Cock o' the North*.—[J. A. HODGE and C. J. B. VOGT.]

N. B. locomotives at Kittybrewster (G.N.S. section) sheds include 4-4-0's Nos. 9037, 9211-2-6, 9634, 9735-7, all class D31, N.B. class M; 0-6-0's No. 9628, *Byng* (class J36), 0-6-2T No. 9863 (class N15), and 4-4-0T No. 10,462 (class D51). 2-8-0's Nos. 6351 and 6370 are at Aberdeen (Ferryhill), 6372 at Dundee, 6286, 6288, 6290-1, 6328 and 6346 at Thornton and Dunfermline. Sentinel-Cammell car No. 9529 is at Dundee. New 4-4-0's of D49 class at Eastfield include Nos. 264 *Stirlingshire*, 265 *Lanarkshire*, 266 *Forfarshire*, 270 *Fifeshire*, and 277 *Berwickshire*. Stationed at Bathgate until recently, the last of the N.B. 2-4-0's, No. 10247 (class E7), built 1873 at Cowlair s has been withdrawn. An old Wheatley 0-6-0 10180 (class J31), built 1869, has also been withdrawn. This engine, with cut-down boiler-mountings for special working, was stationed at Kipps (Coatbridge).—["GLASWEGIAN."]

L.N.E.R. 4-4-2 No. 5267 recently worked to Henley-on-Thames, G.W.R., with a football excursion from Leicester to Reading. The continuation to Henley was for storage purposes.—[L. BLACKHAM.]

Double-heading combinations recently noted on N.B. section include: "Director" 4-4-0 No. 6400 *Roderick Dhu* and G.N. 4-4-0 No. 3060, and a similar combination of No. 6401 *James FitzJames* and No. 3051, in the case of expresses; other (unusual) double-headings of a mineral train by 0-6-0's Nos. 9254 and 9430; mineral train worked by 0-6-2T No. 2590 and banked by G.N. 4-4-0 No. 3062. J39 class 0-6-0's of the original series, Nos. 1448-9, 1451-2-3-5 and 7, have been noted. Can any reader add remaining numbers of the series?—[H. S. C. EVERARD.]

A Glasgow-Edinburgh train was recently noted, worked by N.E. 4-4-2 No. 714.—[G. W. SPINK.]

4-6-2 No. 2568 *Sceptre* recently worked a non-stop test train with dynamometer car from York to Edinburgh. Leaving York at 9.55 a.m., it was due at Waverley at 2.13 p.m. The load was about 450 tons.—["MONK BAR" and C. J. B. VOGT.]

The Reid-McLeod turbine engine constructed a few years ago recently worked from Glasgow to Edinburgh and back.—[C. J. B. VOGT.]

Further "Shire" class engines noted are Nos. 281 *Dumbartonshire*, 246 *Morayshire*, and 249 *Aberdeenshire*. 4-6-2 No. 2580 *Shotover* has been given a higher pressure boiler, &c., and is now classed "A3." She has been working between Edinburgh and Carlisle. G.N. 0-6-2T Nos. 4725-7-9-31 are at St. Margarets and sub-sheds, and Nos. 4723–4 at Dunfermline.—[R. A. READ AND S WILKINSON.]

No. 306 is named *Roxburghshire*. Old N.E.R. 0-6-0's due for scrapping include Nos. 232, 1076, 1123, 1080 and 1076. H. & B. 0-6-0T. No. 2529 has been rebuilt with N.E. "E 1" class boiler, and No. 2509 has a "T 2" class boiler.—[J. W. ARMSTRONG.]

New 0-6-0T engines of "J 50" class are Nos. 583 6-8-9, 591-3-4-6, 601-3-9, 610-6-7 8, 621-2, 635-6, 1037, 1041-5, 1058. 1063, 1068-1070, 1074-9, 1881-2-6. No. 7678 is the only remaining G.C. 2-4-2T of the 7650–7679 series.—[J. G. BROWN.]

G.C. 4-6-2T Nos. 5167 and 5448 are now at King's Cross.—[C. G. WOODNUTT and R. A. H. W.]

New 0-6-2T engines Nos. 2636–7 have been working temporarily in the Manchester district.—[P. M. ALEXANDER.]

Class "N 7" new 0-6-2T built at Doncaster, numbered 2600–12, are at Stratford. Further engines of this type up to 2614 are completed at Doncaster. From Gorton Works Nos. 2632–9 have now been attached to Hatfield depot. Nos. 2659–60 are at King's Cross. G.N. 0-8-2T Nos. 3116, 3127, 3145,

Digitized by Google

3153 and 3155 have been withdrawn. Dynamometer car trials have been made from Doncaster to London and back on the fast-timed 11.4 a.m. up, due King's Cross 1.55 p.m., returning at 4 p.m., with 4-6-2 engines 4473 and 2544. The last-named locomotive has 220 lb. boiler pressure and experimentally reduced cylinder diameter. All three have the new standard improved valve gear. With the dynamometer car the load of the 4 p.m. out has been well over 500 tons as far as Peterboro', which station was reached by No. 4473, on one occasion 5 minutes early. The locomotives attached to Tuxford depot, G.C. (originally L.D.E.C.) have been transferred to the Lincolnshire district. Ivatt small Atlantics are being relegated to some extent to less important duties off the main line. For instance, 3255 is at Boston shed and 3949 has been employed at March, G.E. Engines of this type at Cambridge are Nos. 3252–3–7–8–60 and 3990. *Yorkshire*, the first of the new "Shire" class 4-4-0 express engines, was working expresses between York and Grantham on the G.N. main line at the end of February, and was expected to run through to King's Cross for further trials.—[R. A. H. W.]

Further G.N. 2-6-0's now in service on the Great Eastern section are Nos. 4631, 4669 and 4687. 0-6-2T Nos. 409, 421, 464, 471, 473, 851 and 912, formerly at Hatfield, have also been transferred to this section.—[G. WHITEHOUSE.]

L.D.E.C. 0-6-0T No. 6411 recently came to Bidston (Birkenhead).—[R. K. CURRIE.]

G.W.R.

The following are the numbers of locomotives of each wheel-type in service at the end of 1927: Tender engines—197 (4-6-0), 1 (4-4-2), 344 (4-4-0), 192 (2-8-0), 404 (2-6-0), 39 (2-4-0), 2 (0-8-0), 327 (0-6-0), total, 1,506; Tank engines, 1 (4-4-4), 30 (4-4-2), 175 (2-8-0), 250 (2-6-2), 43 (2-4-2), 122 (2-4-0), 9 (0-8-2), 3 (0-6-4), 481 (0-6-2), 1,195 (0-6-0), 5 (0-4-4), 155 (0-4-2), 32 (0-4-0), total, 2,501; grand total, 4,007. There were 39 steam rail motor cars; 20 electric motor cars; 40 trailer cars; 10,205 coaching vehicles, 88,413 goods and mineral vehicles and 9,674 service vehicles.—[J. F. G.]

Names of G.W. 4-4-0's Nos. 4119 and 4128 should have been given last month as *Wynnstay* and *Maine*, respectively.—[P. M. ALEXANDER.]

New "King" class locomotives in service are: No. 6006, *King George I*, No. 6007, *King William IV*.—[D. B. HART and S. P. W. CORBETT.]

M.S.W.J.R. engines Nos. 10, 11 and 12, now G.W.R. Nos. 1334-5-6 are 2-4-0's, not 2-6-0's.—[K. STRANGE.]

S.R.

Locomotives of the various wheel types were in service at the end of 1927 as follows:—Tender engines, 145 (4-6-0), 11 (4-4-2), 545 (4-4-0), 1 (4-2-2-0), 83 (2-6-0), 292 (0-6-0), 106 (0-4-2), total, 1,183; Tank engines, 4 (4-8-0), 7 (4-6-4), 7 (4-6-2), 66 (4-4-2), 21 (2-6-4), 4 (2-6-2), 1 (2-4-2), 7 (2-4-0), 5 (0-6-4), 138 (0-6-2), 164 (0-6-0), 371 (0-4-4), 76 (0-4-2), 29 (0-4-0), total, 900; grand total, 2,083. Other items of interest are 576 electric motor cars; 632 electric trailer cars; 8,983 coaching vehicles; 35,877 merchandise and mineral vehicles; 2,498 service vehicles; 8 departmental locomotives.—[J. F. G.]

0-6-2T No. B412 (formerly *Tandridge*), has been noted shunting at Hither Green.—[R. D. G. BELLWOOD.]

0-4-4T engine Nos. A363, A366, A403, A413, A415, have been noted standing on the North Quay at Newhaven.—[E. A. LOVELACE.]

New 4-6-0 goods engines Nos. E834 and E835 have been noted at Clapham Junction fitted with 8-wheeled tenders similar to the one on *Lord Nelson* (*i.e.* with straight-up sides without overhanging coping and with three auxiliary vacuum chambers for the tender wheels). All the "King Arthur" locomotives are now fitted with smoke deflectors *except* the following: Nos. E740, E747, E749, E754, E763, E764, E765, E766, E768, E769, E770, E771, E785, E794, E795, E796, E797, E801, E802, E803, E804, E805, and E806.—["KING GALLERON."]

4-6-0 goods locomotives Nos. E823–7 are at Exeter, Nos. E828–32 at Salisbury, and Nos. E833–7 at Feltham. Recently-superheated 4-4-0's are Nos. 114–5–7, 289 717 and 730. Drummond 4–6–0's Nos. 448 and 450–457 were scrapped in 1925, No. 449 being the only one to run with the prefix O. This engine was scrapped late in 1927. Nos. 369–373, with No. 720, have also been scrapped. [One of these engines appears in the Annual Report as still on the service list in 1927.—ED. R.M.] The only L.S.W.R. 4-4-2T engines with well tanks left are Nos. E0125, 0486, 0520 and 0522.—["745, TINTAGEL."]

Earl Haig's funeral train was worked from Waterloo to the L.M.S.R. by S.R. 0-4-4T.

Digitized by Google

No. E106. The train consisted of two bogie corridor coaches and a bogie van, containing the coffin, in the centre.—[M. REEVE.]

Metropolitan Railway.

Locomotives and rolling stock in service at the end of 1927 were as follows :—Steam tank engines, 8 (4-4-4), 7 (4-4-0), 6 (2-6-4), 4 (0-6-4), 4 (0-6-2), 2 (0-6-0), 7 (0-4-4), total 38 ; electric locomotives, 20 ; electric motor coaches, 193 ; electric trailer coaches, 356 ; steam coaching vehicles, 113 ; merchandise and mineral vehicles, 550 ; service vehicles, 95 ; departmental locomotives, 1.

IRISH RAILWAYS.

Great Southern.

Locomotives in service at the end of 1927 were classified as follows : Tender engines, 19 (4-6-0), 109 (4-4-0), 28 (2-6-0), 30 (2-4-0), 211 (0-6-0), total 397 ; tank engines, 2 (4-8-0), 14 (4-6-0), 23 (4-4-2), 15 (4-4-0), 4 (2-6-2), 8 (2-6-0), 24 (2-4-2), 7 (2-4-0), 2 (2-2-2), 4 (0-6-4), 5 (0-6-2), 38 (0-6-0), 20 (0-4-4), 3 (0-4-2), 2 (0-4-0), 2 ("Sentinel," 0-4-0). total, 173 ; grand total, 398. Other items : 4 steam rail motor cars ; 2 petrol rail motor cars ; coaching vehicles, 1,664 ; merchandise and mineral vehicles, 12,671 ; service vehicles, 1,033 ; 3 departmental steam locomotives ; 2 departmental petrol rail motors.

Large-boilered 4-4-0 No. 335 was working the Rosslare boat express recently in lieu of Woolwich 2-6-0 No. 374, which has gone to Inchicore for overhaul. No. 335 has now been relieved by 2-6-0 No. 381. No. 335 still retains the old G.S. & W. livery. With the exception of 4-4-2T No. 33, she must be the only G. S. & W. engine so painted. No. 335 is used as a spare engine at Cork. No. 338 has been rebuilt with new boiler of Belpaire design. She was similar in design before rebuilding to No. 335, having driving wheels 5 ft. 8 in. in diameter. Two-cylinder 4-6-0 No. 500 is in Inchicore works undergoing alterations. No further engines of the "400" class have yet been converted to two-cylinder engines. The working of boat trains in Waterford district is undertaken by "B" class 0-6-0 engines. Amongst those so noted are Nos. 138, 159, 167, 240 and 243. M.G.W. No. 587 and W. & L. No. 235, both 0-6-0, have also been employed on these trains. "B" class 0-6-0's No. 188 and No. 170 are undergoing repairs at Inchicore works, having been involved in accidents. A recent visitor to Waterford was M.G.W. 0-6-0T No. 552. D.S.E. 4-4-0 No. 450, 2-4-0 No. 422, and 0-6-0's Nos. 440 and 441 were noted at Waterford goods yard in February.—[URBS INTACTA.]

D. & S.E. 2-6-0 No. 15 reappeared on the D. & S.E. section on New Year's eve. It is renumbered 461. No. 16, a sister engine, has been sent to Broadstone works for overhaul. G.S. & W. 0-6-0 No. 211 has replaced No. 16 on the 8.45 p.m. freight operating on alternate nights with 2-6-0 No. 461. No. 444 is now stationed at Canal Street, Dublin, for working market "specials" to Liffey Junction yards. D. & S.E. engines now work the boat trains through to Kingsbridge from Carlisle Pier. 2-4-2T No. 430 (11) and No. 437 (29) usually perform the duties in the evening, and 4-4-2T No. 34 in the morning. Ex W.L. & W. 0-4-4T No. 279 is now stationed at Canal Street Shed (D. & S.E.) after general repairs at Inchicore.—[J. J. KENNEDY.]

Other Railways.

Locomotives classified as follows are in service on the Great Northern Railway : Tender engines, 4 (2-4-0), 63 (4-4-0), 98 (0-6-0), total, 165 ; Tank engines, 20 (4-4-2), 1 (4-4-0), 6 (2-4-2), 4 (0-6-4), 4 (0-6-2), 1 (0-6-0), total, 36 ; grand total, 201. Other items : 10 passenger and 1 goods electric tramcars ; 669 coaching vehicles ; 5,752 merchandise and mineral vehicles ; 480 service vehicles and 3 departmental locomotives.

Belfast & County Down locomotives now in service are : Tender engines, 1 (2-4-0), 4 (0-6-0), Tank engines, 2 (0-4-2), 4 (2-4-2), 14 (4-4-2), 1 (0-6-4) and 4 (4-6-4) total 25 ; grand total, 30. Other items : 214 coaching vehicles ; 689 merchandise and mineral vehicles ; 89 service vehicles.

The Northern Counties Section of the L.M.S.R. has in service 14 (2-4-0), 37 (4-4-0), and 15 (0-6-0 tender locomotives, and 2 (4-4-2), 6 (2-4-2), 1 (2-6-0), 5 (2-4-0), 3 (0-6-0), and 2 (0-4-0) tank engines ; total, 85. There is also the steam rail motor car, 366 coaching vehicles, 2,481 goods and mineral vehicles, 134 service vehicles, and 1 departmental locomotive.

The Londonderry & Lough Swilly Railway has in service 2 (2-8-2) tender engines and 4 (4-6-0), 8 (4-6-2), 2 (4-8-4) and 1 (0-6-0) tank engines, total 17.—[J.F.G.]

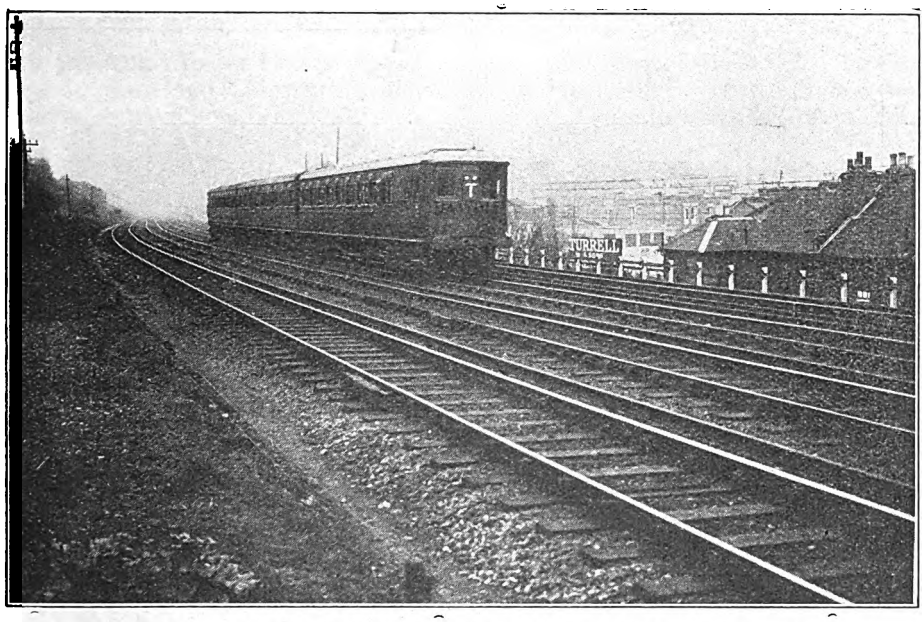
Information has also been received from "A I. R." K. R. Vasey, A. V. Barkway, E. Manuel, G. Whitehead, E. A. Andrews, R. Webster, "Niagara," R. E. Daniells, and others.

Digitized by Google

THE LIBRARY
OF THE
UNIVERSITY OF CALIFORNIA

Digitized by Google

Digitized by Google



TATTENHAM CORNER TRAIN ON DOWN MAIN LINE NEAR FOREST HILL.
At busy periods Nine-Car Trains are run.

To Tattenham Corner by Electric Train.

FURTHER ELECTRIFICATION ON THE SOUTHERN RAILWAY.

PARTICULARS were given last month of the further electrification which the Southern Railway was inaugurating, and since March 25 electric trains have been working on the new services covered by this stage, though further developments are due to be completed by June next. The main features of these two stages are very clearly indicated by the poster previously reproduced, and this is now repeated, the two stages being differentiated by distinctive markings (red and green on the original).

It will be remembered that for some time past work has been in progress in regard to the conversion of routes higherto operated on the overhead A.C. system to conductor rail D.C. traction. Most of this part of the work is covered by the June stage, but in several places electric trains are now running on the D.C. system over routes which continue to be used also by A.C. trains, and conductor rails have already been laid on many of the second-stage routes. For the time being, therefore, there are some miles of route fitted with both overhead and third-rail conductors, and in places trains on both systems are using the same tracks. The important feature of the routes on which electric trains are now inaugurated is, however, that it covers mainly services hitherto operated by steam trains only.

At London Bridge the majority of the tracks in the Central, Eastern and Low Level stations have been fitted with conductor rails, but the new working at present affects only part of the Central station and the Low Level station, in that the Eastern main platforms already carry electric trains and the South London lines come under the June programme. Thus,

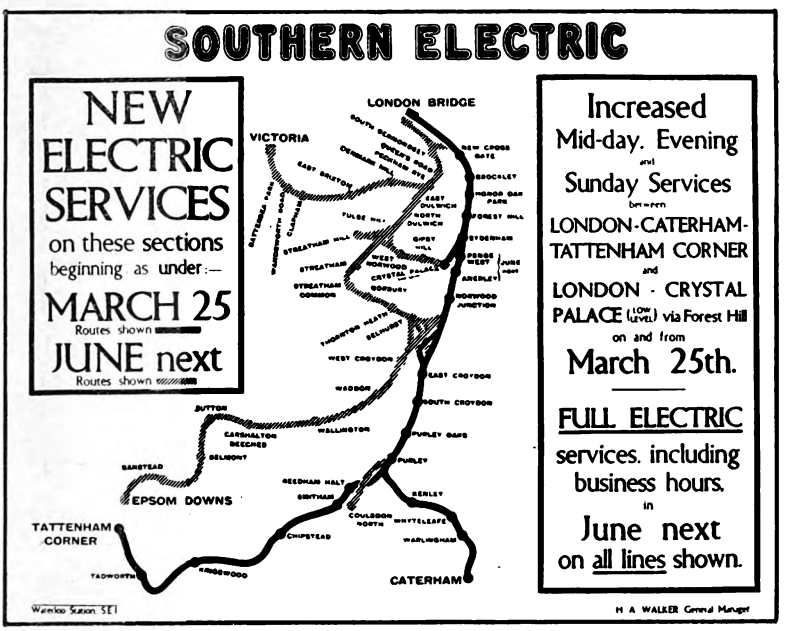
Digitized by Google

Digitized by Google

: is only the trains to the Crystal Palace nd the Caterham and Chipstead Valley ranches which have now been electrified, hough work is well advanced in regard) the conversion of the A.C. sections nd the equipment of certain other lines ot hitherto worked electrically at all.

The new work so far utilised therefore onsists of the equipment of Central and ow Level platform lines at London ridge, of three lines (hitherto steam only)) Corbett's Lane, of four lines through lew Cross Gate to Sydenham and onwards, ve lines through Norwood Junction to outh Croydon and four lines to Purley, nd of the two-track branches from ydenham to Crystal Palace and from urley to Caterham and to Tadworth and attenham Corner. Overhead conductors re also in use between Norwood Junction nd Purley, *via* East Croydon, and on this ection A.C. electric trains continue to un, for the time being, from East Croydon) Coulsdon North; otherwise the routes escribed constitute new equipment.

The June programme involves the ompletion of two London Bridge—London ridge routes: (*a*) *via* Sydenham, Crystal alace and Tulse Hill; and (*b*) *via* Norood Junction, Selhurst, Streatham and Tulse Hill. There will also be the South London line; the Tulse Hill and West Norwood connection to Streatham Hill, in preparation for the conversion of the Victoria—Streatham Hill and Victoria—Streatham Common routes with the adaptations of the Selhurst, Norwood Junction, East Croydon and West Croydon connections; the Purley—Coulsdon North section, the West Croydon—Sutton section, and the new equipment of the Sutton—Epsom Downs branch. The conversion of the Victoria—Selhurst section, the Mitcham Junction route to Epsom, and the Wimbledon and Tooting, Herne Hill and Tulse Hill, and Crystal Palace—Beckenham Junction lines will be converted or newly equipped early next year, thus completing the present suburban electrification programme.



REPRODUCTION OF SOUTHERN RAILWAY POSTER ANNOUNCING NEW ELECTRIC SERVICES.

Train services on the new routes are at present temporary, and consist mainly of adaptations of the steam services hitherto operated. Many of the Caterham and Shipstead Valley trains are run together between London Bridge and Purley, though some of the services involve a change at Purley in the case of one route. A good proportion use the Low Level station at London Bridge as their terminal,

Digitized by Google

Digitized by Google

Digitized by Google

but a few work to Cannon Street or Charing Cross, as hitherto. The new trains are comparatively frequent, while on Sundays there is a regular half-hourly service.

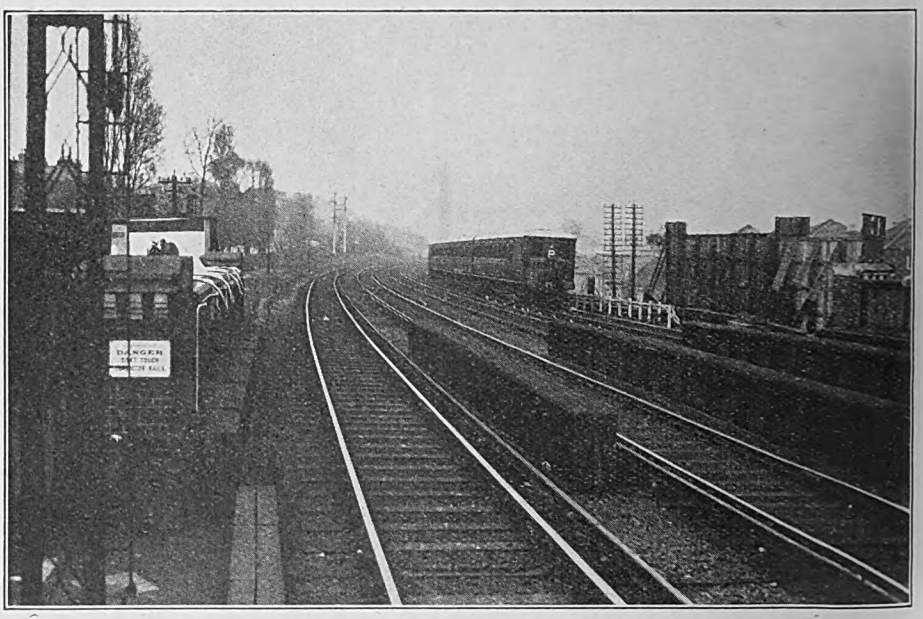
An important point is that, whereas Tattenham Corner station was only used for race traffic, it is now served regularly. Incidentally, it will this year be possible to work a good deal of the Derby race traffic by electric trains, while next year this will also apply in regard to the Epsom Downs route.

The Tattenham Corner trains carry the letters "S" and "T," while the Caterham trains bear the letters "L" and "H." Crystal Palace trains are lettered "P."

As it is not easy, and in some cases it is not practicable, to dissociate the works belonging to one stage from those relating to another, further remarks apply to all three stages. In some cases portions of the equipment will not apply until the second stage is ready for service, but, as work is being advanced every day, the following notes are given as they will apply to the completed scheme so far as Stages I and II are concerned.

The scheme provides for the electrification of 83 route miles of running lines and sidings, or a total of 238 single-track miles. Nine new rotary converter sub-stations are being erected, with extensions to certain existing sub-station plant, converted rolling-stock is being provided, and a large and up-to-date cleaning and inspection shed has been erected at Selhurst.

Power is supplied in bulk by the London Electric Supply Corporation. Six feeders are run from the Supply Corporation's generating station at Deptford to the railway company's distribution sub-station at Lewisham. The switchgear for the control of these feeders is installed in a new extension built on to the Lewisham sub-station switch-house; and, in addition to the Deptford feeders, there are six outgoing feeders to the new sub-stations. Provision is being made for the addition of two future incoming feeders.



CRYSTAL PALACE TRAIN ON DOWN LOCAL LINE NEAR FOREST HILL.
At busy periods Eight-Car Trains are run.

Of the six outgoing feeders at Lewisham, three supply the sub-stations at Forest Hill, Norwood Fork, Purley, Kingswood, and Warlingham. The remaining three supply Tulse Hill, Streatham, and Sutton sub-stations. The sub-station at South Bermondsey is supplied by tappings off the existing three E.H.T. feeders from Lewisham to Cannon Street sub-station.

The nine new sub-stations are generally

Digitized by Google

imilar in design to the sub-stations already n operation. The rotary converters and tatic transformers are mounted on the ame floor, and there is no basement. he E.H.T. switchgear is accommodated long one side of the building, and is rranged in two tiers with a gallery for the pper tier, and the gear is housed in oulded stonework cubicles. The oil ircuit-breakers are of the remote mechanially-operated type, and have a breaking apacity of 250,000 kVA. The control witchboard is mounted on the machine oor level under the front edge of the allery, and carries all instruments, switch evers, relays, indicating lamps, &c. The D.C. traction switchgear is also mounted n this control board.

With the exception of South Bermondey, all the sub-stations are identical in ay-out, but the capacities vary from two o three machines. Forest Hill, Purley, utton, Kingswood, and Warlingham are wo machine stations, with provision for n additional machine at the three first-amed. Norwood Fork, Tulse Hill and treatham are three-machine stations, with rovision for an additional machine at ach.

The sub-station at South Bermondsey as been erected in the railway arches under one end of the present South Bermondsey passenger station, and the arrangement of the rotary converters and transformers is modified from the standard arrangement to suit the peculiar conditions. There are three machines at this sub-station, with provision for a fourth. The switchgear is housed in an annexe, which is built along the arches, and is arranged substantially as in the standard sub-stations.

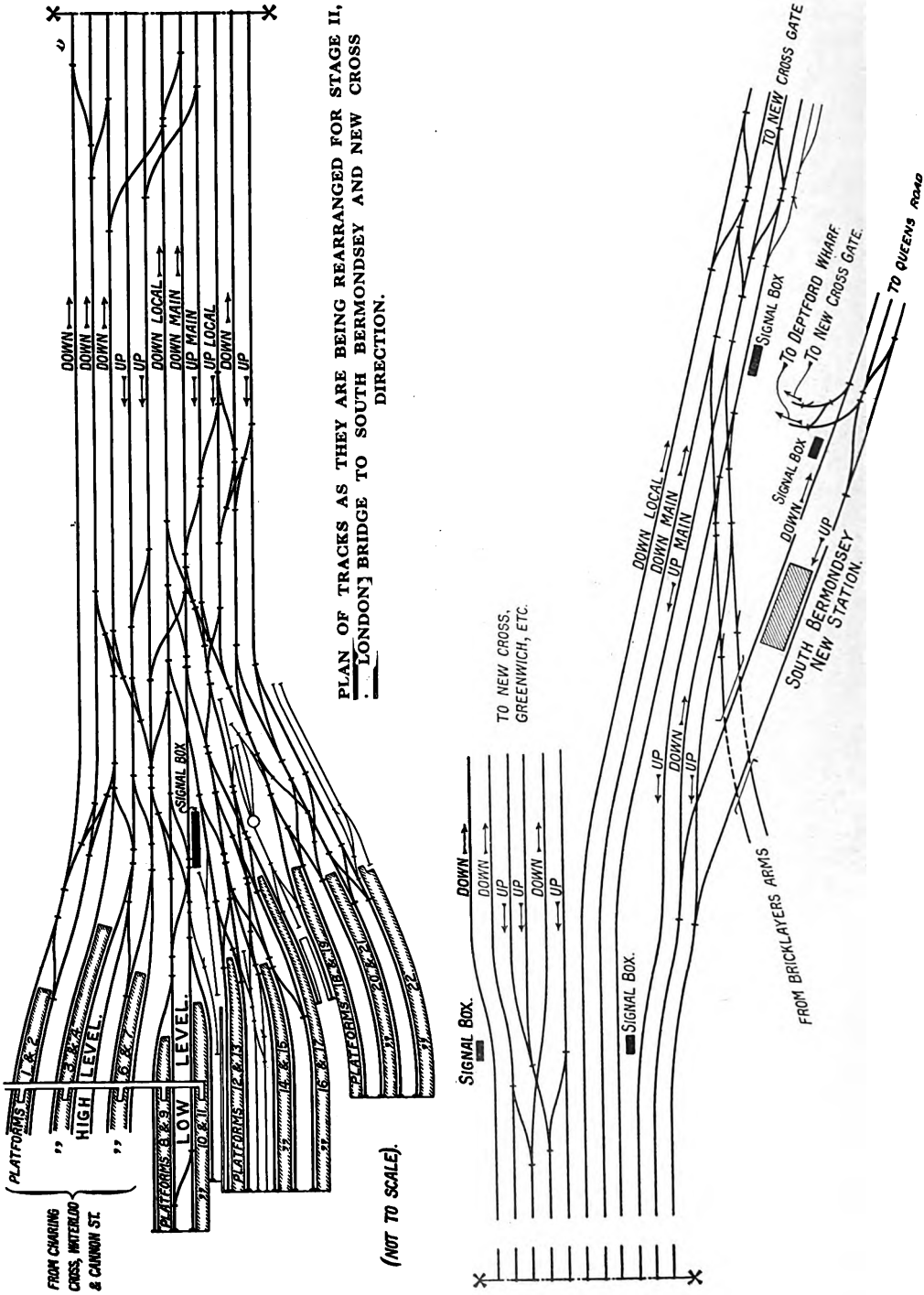
The rotary converter units are generally each of a nominal rating of 1,500 kW., and the efficiency at full load is 96·6 per cent., and at half-load 95·5 per cent. The D.C. pressure at full load is 640–660 volts The starting switchgear for each rotary converter unit is enclosed in a sheet-steel cubicle mounted alongside the machine, each rotary having its own individual starter as a self-contained unit. The starting switches are interlocked in such a way as to prevent a wrong sequence of operation, and consequent damage to the rotary.

NEW FERRO-CONCRETE PLATFORM AT PURLEY OAKS, DOWN MAIN LINE.

It should be mentioned that a complete new rotary converter equipment is being installed at the existing Clapham Junction sub-station, in order to deal with the increased load at this point.

In each of the sub-stations except

Digitized by Google



PLAN OF TRACKS AS THEY ARE BEING REARRANGED FOR STAGE II, LONDON BRIDGE TO SOUTH BERMONDSEY AND NEW CROSS DIRECTION.

Digitized by Google

outh Bermondsey, Kingswood and Warlingham, a duplicate set of 10 kVA. motor generators is being installed in order to provide a 440-volt, 75-cycle supply for signalling purposes. These machines, together with the necessary switchgear, are erected in an annexe at one end of the sub-station.

In addition to the track feeders installed at the new sub-stations, low-tension feeders are provided between the existing Elmers End sub-station and the Norwood Spur line, and between Epsom sub-station and Epsom Downs passenger station.

The positive conductor rail is a standard 100 lb. per yard, Vignoles section top contact rail throughout, and some 9,000 tons of this rail will be required, together with about 150,000 insulators. The bonding of both running and conductor rails is being carried out in accordance with the standard practice of the company, which has already been very fully dealt with in previous articles. There is, of course, a considerable amount of special track cross-bonding, necessitated by the installation of track circuits, in connection with the colour light signalling scheme between London Bridge and New Cross Gate.

The additional rolling-stock for the new passenger services comprises 116 three-coach units and 47 two-coach trailer units. The three-coach units are made up of two motor coaches with a trailer coach between. Trains consisting of one, two, or three of these units, or eight-coach trains made up of two three-coach and one two-coach trailer units, may be made up as desired. The whole of the electrical equipment of this rolling-stock, covering the motors, control gear, lighting and heating apparatus, is identical with the equipment already in operation.

Each motor coach is equipped with two 75 H.P. motors of the totally enclosed, self-ventilating type. The machines are arranged in pairs, on the bogies under the driving compartments at the two ends of the three-coach unit. The new motors are fitted with an improved form of end shield, embodying an enlarged oil well in the bearings, to enable the motors to be run for a week before requiring re-oiling. The control gear is of the all-electric type, with automatic acceleration, arranged for multiple unit working. This master controller incorporates the "dead man's handle," which automatically cuts off the power, and applies the emergency brake should the driver's hand be removed.

Speaking generally, not a great deal of new engineering construction and alteration is associated with Stage I, though Stage II involves some interesting items. At Honor Oak Park the platforms have been lengthened, as also those at Reedham Halt, Chipstead and Kingswood. From Windmill Bridge Junction through East Croydon to South Croydon the down main relief line is fitted with conductor rails, though it was not electrified under the overhead system. At Purley Oaks a new platform, built in ferro-concrete, has been constructed to serve the down main lines (hitherto without a platform), while the down local platform has been altered to provide a platform face on the up main line. At Purley, platforms have also been lengthened and signalling changes are being carried out, while at Tattenham Corner the yard has been re-aligned, the middle lines removed, and the lay-out improved in certain respects.

A new and extensive carriage shed has been erected at Selhurst for the cleaning and inspection of the electric stock. The shed is 600 ft. long by 186 ft. wide with 12 roads, each provided with a full-length inspection pit, the pit walls and the floor between the pits being of mass concrete. The roofing is in three bays. At intervals in the floor, plugging points for vacuum-cleaning plant connections and hydrants for hot and cold water, are provided.

The cleaning is carried out from small portable trolleys, which can be moved along between the roads as required; guard angles are provided in the floor to keep the trolleys clear of the coaches. A brick-built annexe, consisting of offices, mess rooms, stores, &c., has been constructed for the staff.

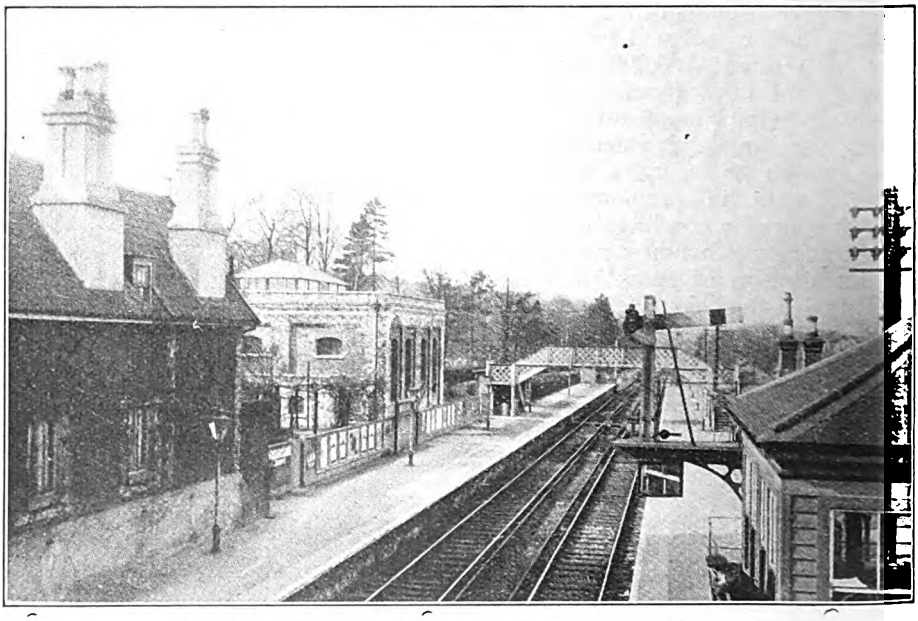
Although not directly concerned in Stage I, several of the operations associated with Stage II call for brief notice, though they will receive further attention in due course. All platform lines in the Central station at London Bridge have been equipped with conductor rails, though only platforms 1—6 are at present used for D.C. electric services. Extensive changes are, however, being made in the lay-out, so that when the new power

Digitized by Google

signal-box (construction is well advanced) is ready and the colour-light signalling system is applied throughout the London Bridge area on both sections (due in June), the lay-out will be as shown on the sketch plan reproduced on page 346. The changes apply mainly to the Central section, and further reference only to them is called for.

At present, when clear of the station connections, there are three lines for traffic in the New Cross direction and three for the South London route. Their applications are: Down main, up main, up local, down South London, "reversible" South London, and up South London. The new order will be: Down local, down main, up main, up local, down South London, and up South London. This means that reversible working will disappear, as with electric traction much of its previous value no longer applies, while the up local (New Cross route) will be obtained by utilising the present down South London line, including its continuation through the present South Bermondsey station *via* the connecting spur from the main route. The remaining two lines on the spur will continue to be available for empty train movements, alternative routing of trains, &c., as at present.

South Bermondsey station is being reconstructed as an island beyond the spur divergence, and from the junction to Old Kent Road Junction the middle line has already been taken out. The three-track lay-out is, however, retained from Old Kent Road Junction as far as Peckham Rye. Beyond this point, except at Tulse Hill, the engineering works involved are not great. Wandsworth Road, East Dulwich, North Dulwich, West Norwood, Gipsy Hill, Belmont and Banstead stations involve platform lengthenings and other minor works, and at North Dulwich signalling changes are being carried out.



WARLINGHAM STATION, SHOWING SUB-STATION.

Tulse Hill will, however, be extensively remodelled. At present lines come in from Peckham Rye and from Herne Hill, and have separate platforms and unconnected lines until leaving the station. There they interconnect to serve routes to West Norwood, Streatham and Streatham Hill. As now in use, however, two trains in the same direction cannot leave or arrive at the station at this end at the same time, so that the whole lay-out is being rearranged to permit of two trains

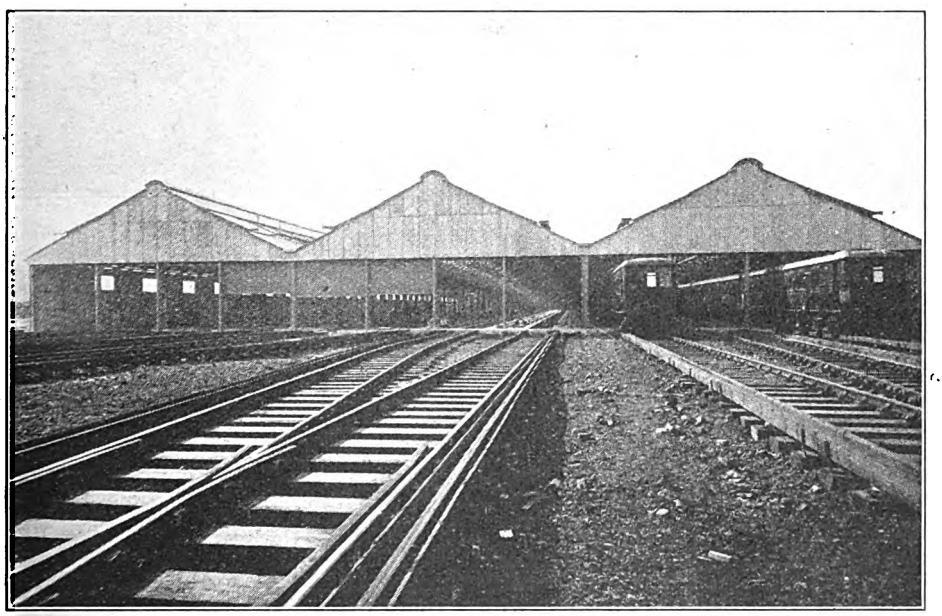
Digitized by Google

moving simultaneously where their further routes do not conflict.

Principal Contractors.

Conductor rails: Dorman, Long & Co. Ltd.
Conductor rail insulators: Bullers Limited.
Conductor rail hook switches: Estler Brothers.
Low-tension cable lugs: Brecknell, Munro & Rogers Limited.
Low-tension cables: Macintosh Cable Company.
High-tension cables: Johnson & Phillips Limited.
Copper bonds and terminals: British Insulated Cables Limited.
Electric train equipments: Metropolitan-Vickers Electrical Co. Ltd.
Bond compressors: Forest City Electric Co. Ltd.
Bond compressors: Estler Brothers.
High- and low-tension switchgear: British Thomson-Houston Co. Ltd.
Additional high-tension switchgear at Lewisham: British Thomson-Houston Co. Ltd.
Sub-station cranes: Herbert Morris Limited.
Gears and pinions: Metropolitan-Vickers Electrical Co. Ltd.
10 kVA. motor generators and switchgear: Electromotors Limited.
Additional switchgear at Elmers End and Epsom: British Thomson-Houston Co. Ltd.
Additional switchgear at Loughborough and Victoria: English Electric Co. Ltd.
Rotary converters and transformers: Swedish General Electric Limited.
Overhead trolleys, Selhurst Shed: Estler Brothers.
Couplers for overhead trolleys, Selhurst Shed: Metropolitan-Vickers Electrical Co. Ltd.
Oil store equipment, Selhurst Shed: S. F. Bowser & Co.
Sub-station lighting: Burdette & Co.
Air compressors: Electromotors Limited.
Sub-station buildings: Edwards Construction Company (South Bermondsey); Wallis & Sons (Lewisham Extension); J. W. Ellingham Limited (Streatham, Forest Hill, Norwood Fork, Tulse Hill, Sutton, Purley, Kingswood, Warlingham).
Cleaning and Inspection Shed at Selhurst: A Jackamen & Son. Ltd.

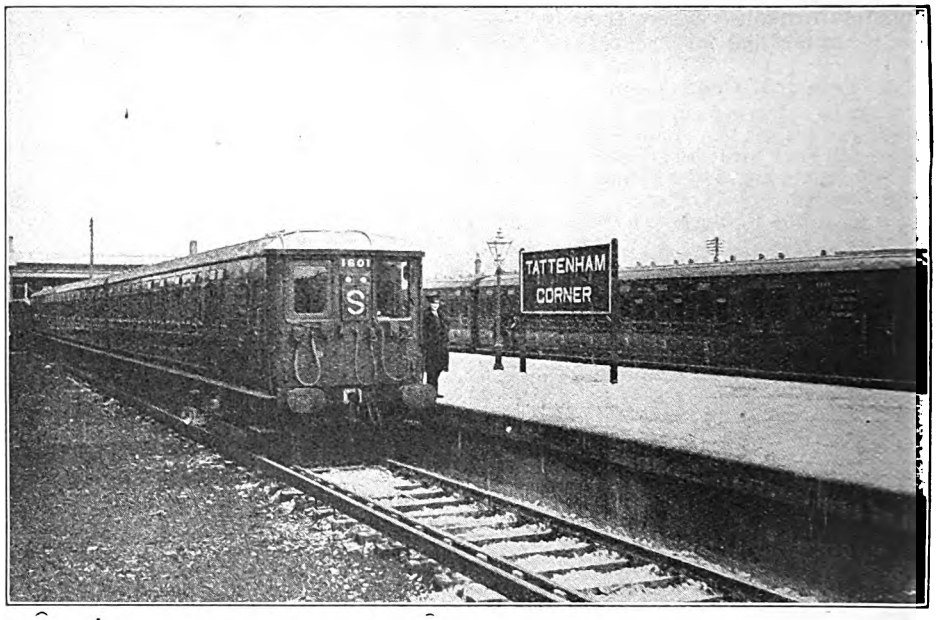
The electrification is being carried out in three stages, and with the completion of the third stage early in 1929, the Southern Railway Company will have put into commission the biggest scheme of electrification of its kind anywhere in the world, costing 11½ million pounds, and covering some 750 track miles.



EXTERIOR VIEW OF SELHURST CLEANING AND INSPECTION SHED.

We are indebted to Sir Herbert Walker, K.C.B., General Manager; Mr. E. C. Cox, C.B.E., Chief Operating Superintendent; Mr. G. Ellson, O.B.E., Chief Engineer; Mr. R. E. L. Maunsell, C.B.E., Chief Mechanical Engineer; Mr. Herbert Jones, Electrical Engineer; and Mr. A. Raworth, Electrical Engineer (New Works), for co-operation in regard to the preparation of this article.

Digitized by Google

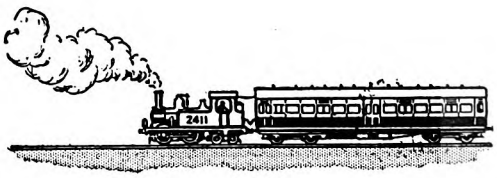


[*Topical.*

TRAINS AT TATTENHAM CORNER, SHOWING SIDE DESTINATION BOARDS.

On Monday, April 2, Mr. E. C. Cox, Chief Operating Superintendent, Southern Railway, read a paper on "Southern Railway Electrification" to the Institute of Transport, and in the course thereof he gave further information as follows :—

On Sunday, June 10, in preparation for the new time-table which will apply from June 17, a considerable rearrangement of lines between London Bridge and Bricklayers' Arms Junction, with consequent signalling alterations, and trains operated on the D.C. third-rail system, will be substituted for the overhead A.C. stock in the services between London Bridge and Crystal Palace and Streatham Hill *via* Tulse Hill and between London Bridge and Victoria *via* the South London line. Sunday, June 17, will see the introduction of full electrical working between London Bridge and Caterham and Tattenham Corner, and the other routes.



Digitized by Google

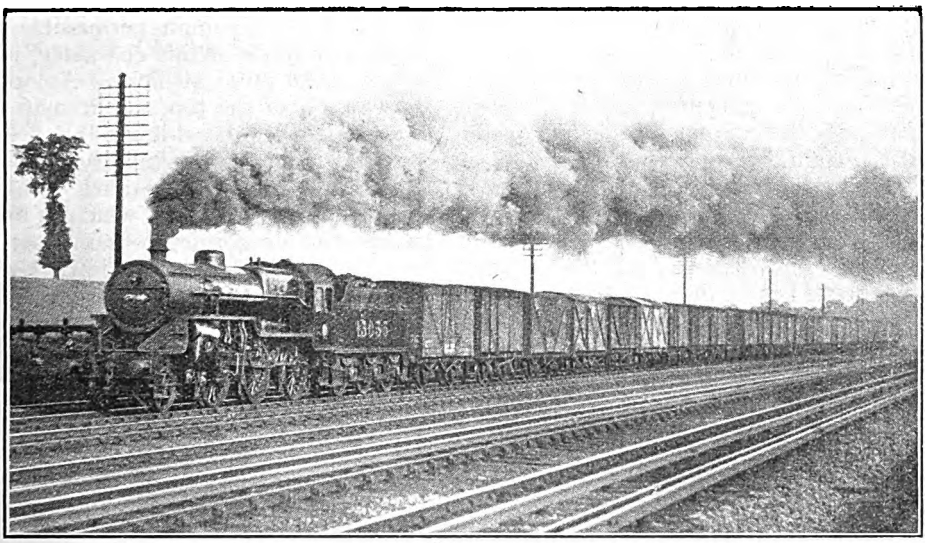


Photo.] [*F. R. Hebron.*

DOWN EXPRESS GOODS TRAIN NEAR HARROW, L.M.S.R.
2-6-0 Locomotive No. 13035.

The Operation of Goods Traffic on Steep Gradients.

By DAVID L. SMITH.

IN all publications dealing in a general way with railway working, the goods department receives its due share of notice, but there is a tendency to concentrate upon the "commercial" side of goods working—the collection and classification of traffic, for example—and to pay but scant attention to the problems of actual train running. Let us, therefore, take a survey of these problems, particularly these associated with lines which are steeply graded, and try to appreciate the difficulties which beset trainmen in the operation of goods and mineral trains over such lines.

The difficulties surrounding the running of goods and mineral trains arise then from two main sources :—

(1) The limited brake power available.
(2) The loose (three-link) couplings.

From the first of these it will be seen that "fitted" goods trains, that is, express goods trains fitted throughout with continuous brakes, do not come within the scope of this survey. Their working is similar to that of a passenger train, and their problems of operation are those of the passenger side. It is proposed to deal more particularly with those trains whose brake power is limited to that of the engine and brake van, with, at the most, a very few "fitted" vehicles marshalled next to the engine and braked therefrom.

As regards steep gradients, these also fall into two categories :—

(1) Continuous up or down grades of considerable length.
(2) "Give-and-take" or "switch-back" grades.

Let us deal with the first of these. There are no very grave problems, save that of engine power, associated with long *up* grades. The pull is continuous and couplings seldom part under a steady strain of this nature. Still, even here we have the possibility of accident. Quite recently

Digitized by Google

a heavy goods train was climbing a steep bank at a brisk rate. An engine coupling-rod broke, dug into a sleeper, and brought the train to a sudden stop; the violent recoil broke the coupling of the first wagon, and the train, overpowering the resistance of the brake-van in rear, dashed back downhill to derail at a catch-points. The 20-ton brake-van is a very efficient deterrent, but deprived of the engine's assistance it has its limits.

The descent of long continuous gradients is a more complicated matter. Let us take, for example, an eight-mile bank descending without a break at 1 in 70. Did rolling-stock and curves permit of unlimited speed, it would be comparatively simple to steam over the top with a train of 35 wagons of coal, say 600 tons gross weight, and let the force of gravity do the rest. The descent would certainly be expeditious, but it is to be feared that any attempt to stop the train, should adverse signals present themselves anywhere near the foot of the grade, would be akin to trying to arrest the progress of an alpine avalanche with a domestic fire-shovel!

It is obvious, therefore, that the speed of the train must be kept within limits from which it may be stopped at any point on the descent should necessity arise. The maximum permissible, for a train and grade of this character, may be taken as 20 miles an hour. Accordingly, as we go over the top, the fireman screws on the tender hand-brake as firmly as possible, the guard similarly applies his van-brake, and both brakes remain on throughout the descent, which is made in a somewhat more decorous manner. Yet it will be found that, in addition, several applications of the engine power-brake will have to be made at various points, in order to keep the speed within the prescribed limits, and that full and prolonged application of this brake will be necessary to effect a stoppage.

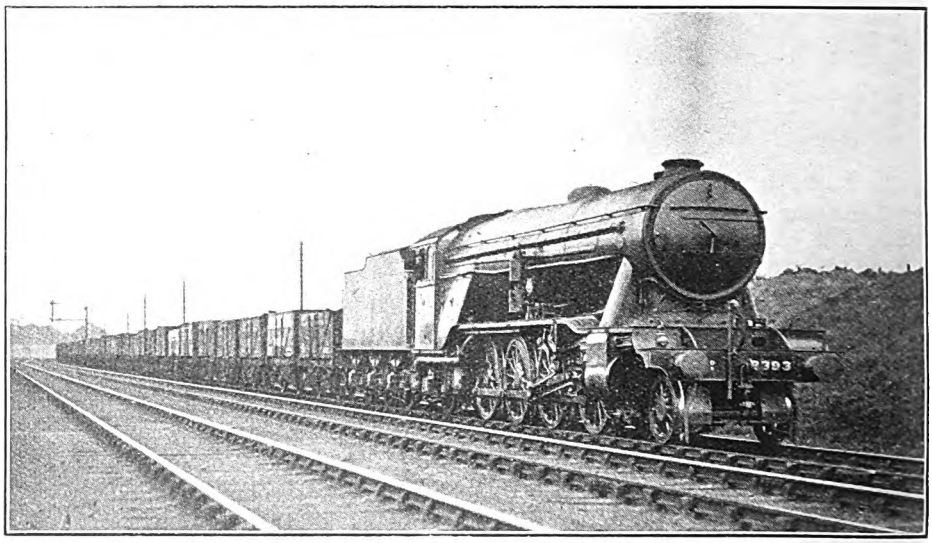


Photo.] **100-WAGON FREIGHT TRAIN, L.N.E.R.** [*F. R. Hebron.*

2-8-2 Booster-fitted Locomotive No. 2393.

In this connection it may be noted that tank engines are at a considerable disadvantage compared with tender engines in the descent of long grades. In the case of the tank-engine, the engine hand-brake is applied at the top of the grade, reinforced by applications of the power-brake during the descent. But both brakes act upon the same set of wheels and brake-blocks, and while the power-brake certainly clasps the blocks tighter, these blocks are already hot, and a hot block is not nearly so efficient a "holding" agent as a cold one. The tender engine, on the other hand, while the tender brake-blocks may become red-hot, has

Digitized by Google

a whole set of cold blocks on the engine-wheels ready to bring into action at any moment.

With a train exceeding about thirty-five loaded mineral wagons, on a bank of this character, it will be found that one engine and van are insufficient for its control. Recourse, then, must be had to the wagon-brakes. The train is stopped on the crest of the bank, and a certain proportion of wagon-brakes, say, one in every six (definite rules are usually laid down on this matter), must be pinned down. These, of course, remain on to the foot of the grade, where another stop is made to lift them.

the speed was not increasing, but it was already uncomfortably high, and at the foot of the grade was a busy junction, with no guarantee of a clear run through. Then the driver of the second engine opened his sand-valves. In about six turns of the wheel both engines were braced back against the train, holding stoutly, and the speed was under complete control.

It will be observed that the difficulty of loose couplings does not bulk very largely in the negotiation of this type of grade, yet very serious accidents may arise from this source. A coupling or drawbar may break, either through a hasty start or a clumsy application of the

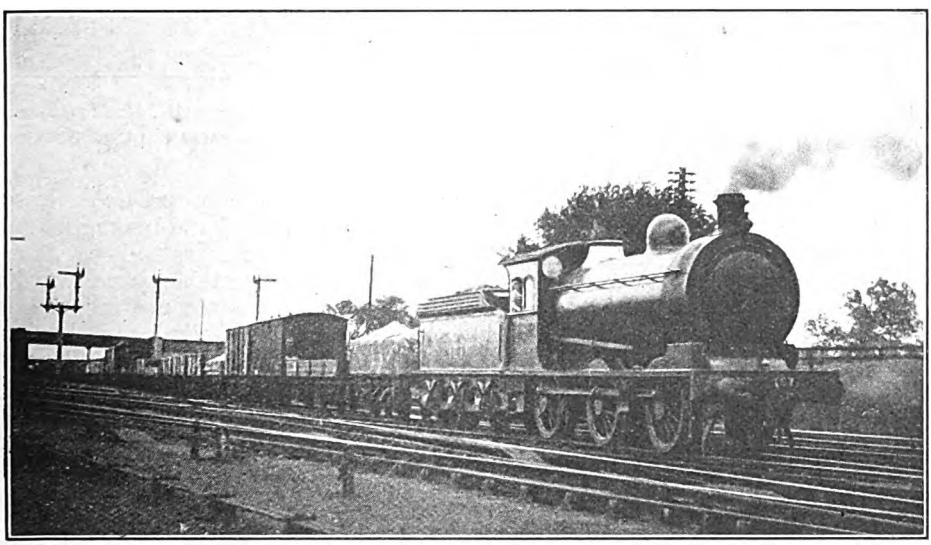


Photo.] [*Henry L. Salmon.*

UP L.N.E.R. GOODS TRAIN APPROACHING YORK FROM THE NORTH.

0-6-0 Locomotive No. 1671.

Yet, even with this formidable array—hand-brakes, wagon-brakes, power-brakes, circumstances may arise which bring grave anxiety to the driver. A greasy rail, a frosty rail, even a hot polished rail, may upset all his calculations. Then it is that the wheels lock and skid, the driver tries in vain for a better grip, and the speed mounts up. But the driver is not at the end of his resources—he has his sand.

A short time ago the writer heard of a double-headed goods train which was descending a long and steep grade on a hot summer's evening. Both engines and van were exerting full braking power,

guard's brake, at the very top of the bank. It may be a dark night. The driver proceeds, ignorant of anything amiss, until on nearing the foot of the grade he discovers, by reason of the quick response to his braking, that something is wrong. He stops to ascertain the state of affairs. Meanwhile the rear portion, having spent some time overcoming the drag of the brake-van, comes thundering down, well out of control, and an unholy pile-up results.

And now we come to a contemplation of our second class of grades, namely, grades of a "give-and-take" or "switch-back" character. Let us again take an

Digitized by Google

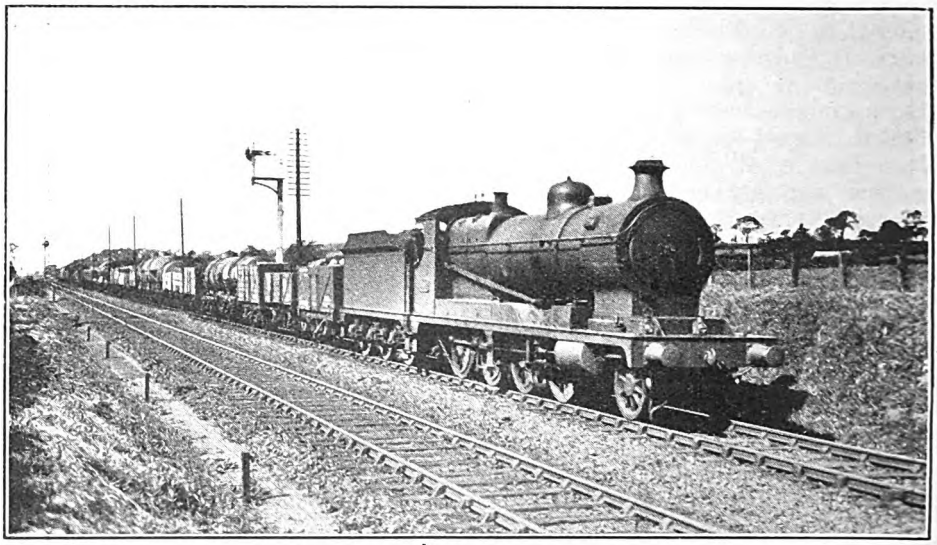


Photo.] [*G. H. Marillier.*

G.W.R. (R.O.D. CLASS) 2-8-0 LOCOMOTIVE ON SOUTH WALES MAIN LINE NEAR PENCOED.

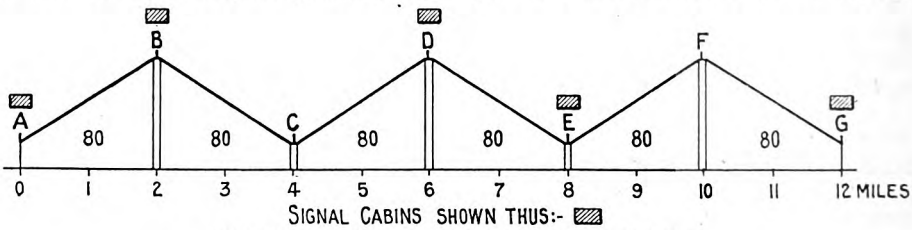
example, referring to the gradient profile reproduced below. This shows a hypothetical section of railway, 12 miles long, stretching from A to G, in which the banks are, very conveniently, each two miles long, and have each a similar grading of 1 in 80. There are three summit-points, designated B, D and F, while the lowest points of the two V-shaped "dips" are marked C and E respectively. Signal cabins, where checks may be expected, are situated at A, B, D, E, and G, respectively.

Let us suppose that we have been given a powerful six-coupled goods-engine, and commissioned to run a non-stop goods-train from A to G, 36 minutes being our time allowance for this 12-mile length. Our train consists of 40 loaded goods wagons—say, 400 tons gross weight—non-fitted, loose-coupled, and with a 20-ton brake van in rear.

Accordingly, we set off and commence our slow and laborious climb up the 1 in 80 bank to B. On passing this point, and remembering our previous lessons, we apply the tender hand-brake, the guard holds tight in the rear, and we descend at a sober and respectable pace toward the point C. Now we are nearing the foot of the bank, and the climb to D begins to loom ahead. Come along now, release the brakes, open the regulator, hammer her up! At a good 30 miles an hour we clatter past point C and go charging at the bank, and then——!

Well, we receive what Scots drivers most expressively term a *rug*, but which Englishmen, for want of a more concise expression, would describe as a violent, tearing jerk. We are pitched headlong against the boiler face-plate, and on recovering our equanimity we will have the pleasure of seeing one, if not two, portions of our train lagging behind, while only a tattered remnant remains coupled to our tender!

As a result of our braking, the front part of our train was buffered tightly up,



SKETCH OF STEEP SWITCHBACK GRADIENT.

Digitized by Google

the couplings were hanging slack, and our short acceleration past point C had been insufficient to tighten them. Consequently, when we struck the up grade and the whole weight of the train hung itself suddenly upon us, out went the couplings with a bang, and devastating consequences ensued.

Obviously, we have hit upon the wrong method of negotiating these grades, and we must seek an alternative plan. We could, of course, employ the "safety first" method by crawling cautiously down each descent, coming to a dead stand at the foot and picking up our couplings "from rest." We should certainly reach train. We must do our bit, too. So let us give our engine steam, and plenty of it, and keep a steady pull on the front of the train. We go down the grade in highly spectacular fashion, but there is no signal cabin at C, so let her go!

Now we come to the crucial point, the bottom of the dip—have we succeeded in keeping the couplings tight? Well, we shall find that, running free and unencumbered by mechanism, the loaded goods or mineral wagon on a down grade is just a little more than a match for a goods engine, even when the latter is steaming. The couplings in the front part of the train will always be hanging

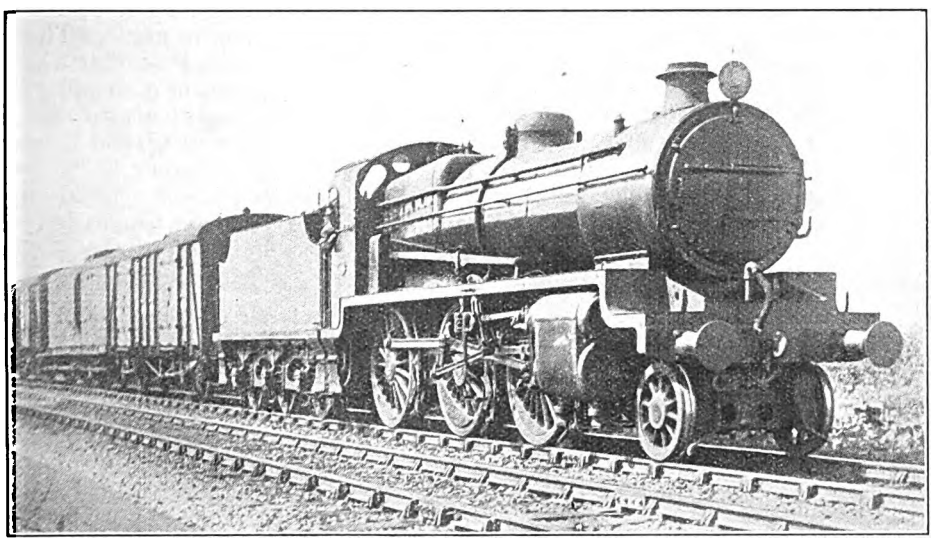


Photo.] [*W. E. Rooksby.*

SOUTHERN RAILWAY 2-6-0 ON MILK AND PARCELS TRAIN.

G with our train intact, but I am afraid that "Control" would become rather sarcastically solicitous concerning our probable dying of old age before the course was completed!

No, let us grapple with the problem afresh. It is quite clear that if the couplings could be tightened at the start and *kept tight,* no trouble from this source would arise. Let us see what we can do towards this end. Let us start again, and pound once more up the grade from A to B. On passing the latter point, let the guard screw on his brake as firmly as possible. But a 20-ton brake cannot keep all the couplings tight on a 40-wagon a little slack, and we shall be pretty lucky if we get past C without experiencing a *rug,* which, however, should be sufficient only to disturb our balance, and should leave our train intact.

So now with the fine momentum of our descent, we make short work of the bank up to D. Passing this summit point, we prepare for another fast descent to E. But here comes a difficulty. There is a signal cabin at E. Signals there may be adverse, and should we be running at the same pace as in descending to C we would not have the proverbial "Chinaman's chance" of stopping. So we must compromise by applying brakes at D

Digitized by Google

and descending cautiously until we can get our first sight of E's distant signal. Should it be at "clear," then we must off brakes and steam for all we are worth in an endeavour to tighten as many couplings as possible before we strike the up-grade to F. The E dip is therefore more difficult to traverse than that at C.

And now there remains only the climb to F, depending largely on the momentum we have acquired in our previous descent. At F we must again brake and keep the train under thorough control throughout the following descent in readiness for the dead stop at G. We shall reach there with not much to spare out of our 36-minutes allowance, and thoroughly of opinion that one need not go to the Wild West of America for railroad thrills!

But trains are not all single-headed. Let us suppose that we have 60 wagons instead of 40, and are assisted in front by another engine. If both engines are fitted with the same type of continuous brake, the hoses may be coupled and the two braked simultaneously. But should one or both be fitted with a steam brake only, no coupling is, of course, possible. Braking must be done independently, and much confusion may arise.

Say that we are cautiously descending the bank toward E. We sight E distant at "clear." The leading driver releases his brake before we have time to lift ours. He may easily snap the coupling between the engines; or, alternatively, he may elect to keep on braking, or to run without steam down to E. We do our best, but single-handed, and, pushing our "assistant," we cannot lift the slack, and a bad *rug* ensues at E and probably a break-away.

Again, it may be dark, or there may be a thick fog, or heavily falling snow. All our landmarks go by the board; changes of gradient can be found only by the variation in speed of the engines, and the confusion of dual control becomes worse confounded. We may get a *rug*, but it will be extremely difficult, in the darkness, and particularly should a considerable proportion of the train remain attached to us, to determine whether a break-away has actually occurred. We can only keep going and look back for the van lights on the first curve. A driver whose reversing gear had been giving trouble by "dropping into fore-gear" was running through a "dip," one dark night, when his engine suddenly accelerated with a roar, and the driver spent some time trying to "draw-up" his gear again before he realised that the train had parted behind the fourth vehicle, and that the reversing gear was not at fault.

Night-running over this road may have certain advantages, however, as all signal boxes save those at A and G will have been switched out, and we can run freely throughout, with no fear of being checked at a critical point such as E.

It may be noted that the risk of a collision between the portions of a divided train is not so great on switchback grades, as the divided portion quickly comes to a stand on striking the up grade. There is always the chance, however, that a drawbar may break instead of a coupling, and a broken drawbar, partly pulled out and catching a sleeper, may up-end a wagon and a very ugly smash result.

So far the writer has not touched on the subject of fitted vehicles marshalled next the engine for braking purposes. These are an immense help, particularly in the descent of long grades, but, of course, this augmented brake power requires proportionately careful handling if we are to avoid breaking couplings on the loose-coupled train behind.

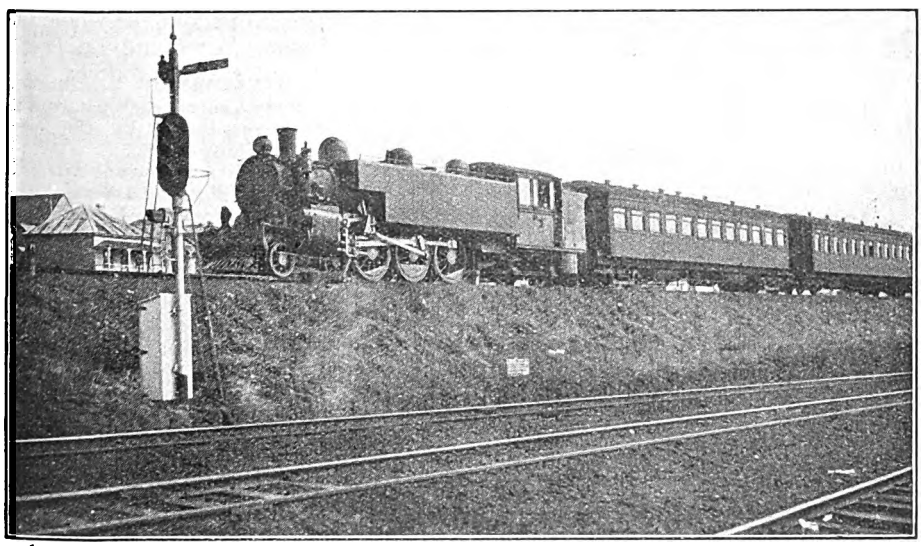
There are fitted vehicles, however, *and* fitted vehicles! A driver friend of the writer's, approaching a station with a heavy goods train, descried in the siding a large fitted van, loaded and ready to lift. He asked that it might be placed next his engine, to assist in controlling the train on the very steep section beyond. The guard naturally objected, insisting that the van be placed in its appropriate place according to the marshalling of the train. Much wordy warfare ensued. The driver finally won his point, and the van was triumphantly attached in the desired position. It was then discovered that the rolling rubber ring of its brake piston was rotted away and the brake quite useless!

Some of us may be of opinion, after thus surveying the matter, that working goods trains is much more difficult than working passenger. Others may point to the elasticity of goods schedules as compared to the cast-iron ones to which passenger trains have to conform. But all goods

Digitized by Google

schedules are not elastic. There are goods trains which have to cross passenger trains at certain stations on a single line. There are trains which have to run in advance of expresses to a certain "refuge" point. There are trains which have to make "tight" connections at junction-points for transfer traffic. None of these can afford to lose time. Day by day the hand of Control is tightening on all goods services, and lost time has to be very definitely accounted for. Taking all into consideration, we may safely say that those comparatively obscure railway servants who occupy the footplates and brake vans of our goods trains are doing work which is at least as difficult and as onerous as that performed by their more advertised brethren of the passenger department.

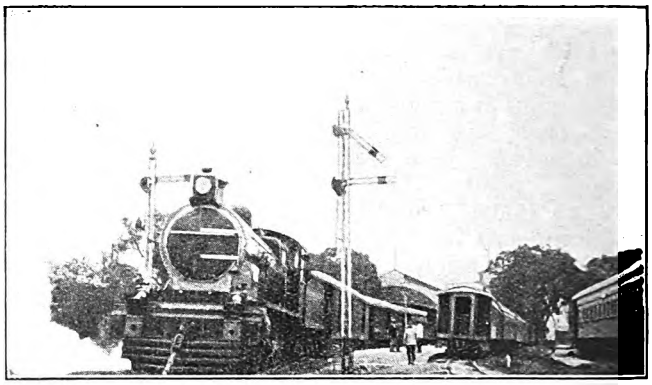
CHRISTMAS DAY IN NEW ZEALAND, 1927.



Mr. C. J. Housego, of Auckland, New Zealand, sends the photograph reproduced above, taken on Christmas Day last year. It shows an Auckland-Helensville train standing at signals at Newmarket Junction. Mr. Housego explains that, owing to Newmarket station being situated on the main line beyond the junction with the northern line, and the difference in rail level, due to the 1 in 42 grade of the main line, trains from Auckland using the northern line have to back out of Newmarket station into a dead-end siding in order to reach the curve to the northern line. Trains approaching the junction, from beyond Newmarket station can however, proceed direct to the Northern line, so that the manœuvre described applies only to trains running to and from Auckland. The double movement made by these trains could, of course, be avoided by running the engine round the train in Newmarket station, but by using the dead-end siding and a triangle formed by the various connections, reversal of the whole train is avoided. The view shows both old- and new-type signals, the main line being signalled on the three colour-light system for about 30 miles. The branch so far has old-type signals.

Digitized by Google

The International Rail Route between Argentina and Bolivia.



BUENOS AIRES "RAPIDO" LEAVING TUCUMAN.
Argentine State Railways express from La Quiaca in centre.

By INGRAM A. BARRETT and H. R. STONES.

SINCE the completion towards the end of 1925 of the Bolivian State Railway, between Villazon and Atocha, a distance of 123 miles, the last remaining link in the International Rail Route between the South American Republics of Argentina and Bolivia, has been completed. This route can be said to afford access to some of the finest mountain scenery in South America, and brings one within easy reach of the mighty Andes, and the romantic land of the Incas, as portrayed by W. H. Prescott in his book "The Conquest of Peru."

The distance from Buenos Aires to La Paz, is about 1,633 miles, the journey between the two Federal Capitals occupying almost five days, and being accomplished in five distinct stages, which enable the traveller to fully appreciate the scenic beauties of the route.* In this connection, it should be mentioned that four different railway companies are at present concerned with the international traffic, namely :—The Central Argentine Railway, the Argentine Central Northern Railway (State-owned), the Bolivian State Railways (Villazon–Atocha Section) and the Antofagasta and Bolivia Railway. The first-mentioned has a gauge of 5 ft. 6 in., while the others are metre-gauge. These railways form the quickest and most direct route between Buenos Aires and La Paz, although it would be possible to work through traffic by two other alternative routes, maintaining the same metre-gauge throughout the whole journey between Buenos Aires and La Paz. The alternative routes are as follows :—

(1) By Cordoba Central Railway from Buenos Aires to Tucuman, thence by the Argentine Central Northern Railway, &c.

(2) By the Province of Buenos Aires Railway (Compañia General) from Buenos Aires to Rosario, thence by the Santa Fé and Argentine Central Northern Railways, &c.

The above routes (see map on page 367) would entail a considerable increase in the mileage, and up to the time of writing no through working of International passenger traffic from Buenos Aires has yet been undertaken by the Cordoba Central, Santa Fé or Province of Buenos Aires railways. It is, however, interesting to note in connection with the International Exhibition held in La Paz towards the end of 1925, on the occasion of the Centenary of the Independence of Bolivia, that a train of 27 freight wagons, &c., containing the Argentine Exhibits of national products, &c., was run from Buenos Aires to La Paz by the second route mentioned above.

Leaving the palatial Retiro terminus of the Central Argentine Railway in Buenos Aires on a Saturday at 5 p.m., the International train, after leaving the Argentine capital, passes through flat and undulating country, which is characteristic of almost the whole journey between Buenos Aires and Tucuman by the Central Argentine Railway, and 4½ hours later, reaches Rosario, the second city of importance in the Argentine Republic. From Rosario,

[* This was so when the article was prepared, but nowadays through sleeping-car services run between Tucuman and La Paz. Ed. R.M.]

Digitized by Google

the train passes on to Ceres, where the country, although still undulating, may be said to assume a wilder aspect. Before reaching Tucuman, one observes the extensive sugar plantations, which lie in close proximity to the railway.

Tucuman is reached at 6 p.m. on a Sunday, and it is here that passengers experience their first change, namely, from the broad-gauge trains of the Central Argentine Railway, to the metre-gauge trains of the Argentine Central Northern Railway, which runs up to the Bolivian frontier. The station at Tucuman, which is terminal, is covered in by a roof divided in two spans. There are two platforms, one of which is of the "island" type. The Central Northern trains use the outer face of the island platform, while the inner face and the remaining platform accommodate the trains of the Central Argentine Railway, whose line terminates at Tucuman. It should be mentioned, that in addition to using the Central Argentine station for the interchange of International traffic, the Central Northern Railway have their own station in Tucuman, from which extensive services are operated in various directions.

Tucuman, the fourth city of the Argentine Republic, is of considerable importance, being in the centre of the sugar industry. The town has a population of about 100,000 inhabitants, which has rapidly increased during recent years. The climate is semi-tropical, being hot in summer, but the winters are quite temperate and the nights cold.

The Central Northern train for the Bolivian Frontier leaves Tucuman at 8 p.m. on a Sunday evening, and is usually made up as follows :—

4 Vans (including postal vehicles)	La Quiaca.
2 Sleeping Cars (detached at Guemes)	Salta.
1 Sleeping Car	Jujuy.
1 ,, ,, ...	La Quiaca.
1 Composite Saloon Car ..	Jujuy.
1 Restaurant Car	To Quiaca.
1 Kitchen Car	La Quiaca.
Total— 11 vehicles.	

As will be seen from the above, the vehicles for the Bolivian frontier are seven in number, the remaining vehicles being for intermediate destinations.

Leaving Tucuman by the Central Northern Railway, the line rises sharply for nine miles, and reaches Tafi Viejo, which owes its importance to the fact that the workshops of the Central Northern Railway are located there. From Tafi Viejo the scenery changes, and thickly wooded valleys and low ranges of mountains take the place of the flat country.

The next point of importance reached is Rosario de la Frontera, the railway having now reached the altitude of 3,180 ft. above sea level. Rosario de la Frontera is a growing tourist resort, and is frequented by invalids and those wishing to escape from the cold winters of Buenos Aires. A fine hotel is situated about six miles from the station. Owing to the presence of mineral water springs in the neighbouring mountains, thermal baths have been installed in the vicinity.

The next station worthy of mention is Guemes, 179 miles from Tucuman, and the junction for Salta, from which it is 30 miles distant. Salta is the capital of the Province of Salta, and has a population of 20,000 inhabitants. As was mentioned previously, the two sleeping cars for Salta are detached at Guemes.

From Guemes the line still rises steadily, and Perico is reached. Just north of this station a branch line strikes off to Embarcación, this forming an alternative route to Bolivia, via Embarcación and Yacuiba, a town close to the frontier.

The International train arrives at Jujuy at 7 a.m. on a Monday morning, and waits there an hour for re-marshalling purposes. Jujuy is one of the important towns in the north of the Argentine Republic, and is the capital of the province of the same name. Owing to its proximity to the Bolivian frontier, Jujuy is an important military post, having extensive barracks on the north side of the town, which is picturesquely situated in a valley surrounded by high mountains.

After leaving Jujuy, the railway follows the course of the "Rio Grande de Jujuy" through Reyes and Yala to Leon, which is situated 14 miles from Jujuy. From this point the gradient is too steep for the ordinary adhesion locomotives, as a result of which the "ABT" system of rack has been adopted. The International trains for the north are split at Leon, the first portion of the train being taken up the gradient, which is nine miles in length, to

Digitized by Google

Digitized by Google

Volcan, being followed half an hour later by the remainder of the train. The locomotives employed on the rack section of the line are of the 0-8-2 rack-adhesion type, with side tanks, and built by the Esslinger Locomotive Works, Germany, in 1905. It is interesting to note that the gradient between Leon and Volcan in some parts is 6 per cent., the time taken to accomplish the nine miles of rack being 1 hr. 45 min. At Volcan the train, as originally composed, is made up again, and proceeds on its journey drawn by a 4-6-2 type Baldwin locomotive, burning oil fuel.

Still following the "Rio Grande de Jujuy," the railway winds its way through a series of deep rock cuttings. At this point the scenery is very desolate and monotonous. The vegetation is scarce with the exception of cactii and low stunted bushes, which will be observed on the mountain-sides. A number of stations are passed, including Tilcara and Humahuaca, the latter town standing at a height of 9,931 ft. above sea level, and with a population of over 1,000 inhabitants. Humahuaca, which is situated 99 miles from the Bolivian frontier, is the last town of any importance in the Argentine. At Iturbe the railway leaves the river course and makes a rapid ascent to Tres Cruces, the highest point reached by any railway in the Argentine Republic, being 12,100 ft. above sea level.

La Quiaca is reached at 7.40 p.m. on a Monday evening. The town itself is small and scattered, and stands on a sandy plateau devoid of all vegetation, at a height of 10,960 ft. above sea level. We have now reached the frontier of Argentina and Bolivia, and also the terminating point of the Argentine Central Northern Railway. From La Quiaca one can observe the small Bolivian town of Villazon, about one mile over the frontier.

The journey into Bolivia is now continued on the Bolivian State Railways (Villazon–Atocha section), but, owing to the fact that the Bolivian State Railway train does not leave La Quiaca until noon on a Tuesday, the international passengers are obliged to stay in La Quiaca over the night. The following morning, after the usual customs formalities have been gone through, passengers join the Bolivian State Railway train, which is drawn up in front of the Customs-house at La Quiaca. This is due to the fact that the Bolivian State Railway Company have at present made no arrangements with the Argentine Central Northern Railway for the use of the latter company's station, although the metals of the two companies are joined and are used for through freight vehicles.

Leaving La Quiaca, the line descends sharply, and about half a mile away crosses over the frontier viaduct into Bolivia and enters Villazon, a small Bolivian frontier town. The train waits at Villazon for an hour to enable a further examination of baggage, &c., by the Bolivian customs authorities.

From Villazon to General Medinaceli the line rises sharply, and later descends in a series of bends into a valley, along which flows the River Suipacha. This river is followed as far as Tupiza. During the course of the journey the railway crosses the river several times by means of substantial bridges, which have been constructed of stone, and passes through deep gorges. The embankments and bridges along this part of the line have been reinforced to counteract the heavy floods caused by the rivers, which in summer time often wash away the embankments and cause many landslides.

A few miles from Tupiza the railway passes through a gorge, the sides of which are almost perpendicular, and eventually enters a short tunnel cut through the solid rock.

The train reaches Tupiza at 5.15 p.m. on a Tuesday, and passengers are obliged to put up for the night as the train does not leave until the following morning at 7.0 a.m. Tupiza, 62 miles from La Quiaca, is situated in a deep valley, and has a population of about 5,000 inhabitants. The valley near the town is quite fertile owing to the extensive irrigation work that is being carried on in the vicinity of the river.

Leaving Tupiza for the north at 7.0 a.m. on a Wednesday, the line continues to rise steadily and, still following the river, winds its tortuous way through narrow valleys. Approaching Escoriani, the railway passes through more open country. Escoriani is the highest point on the Villazon-Atocha section of the Bolivian State Railways, and is situated 13,310 ft. above sea level. On the right of the line,

Digitized by Google

Digitized by Google

some distance away, one is able to view the majestic snow-clad peak of "Santa Barbara." From Escoriani, the elevation of the railway drops for about 1,200 ft, and the line crosses the river by a trestle viaduct, and enters Atocha, the terminus of the railway.

Atocha is a typical Indian town, situated in a sandy valley. There are several small hotels, and extensive mining is carried on in the vicinity of the town. It may be mentioned that Atocha is also the terminus of the Uyuni-Atocha branch of the Antofagasta (Chili) & Bolivia Railway. The station of the latter company is situated about 300 yards from the station of the Bolivian State Railway, but, although the metals are connected, no through trains have yet been inaugurated between La Quiaca and La Paz.

From Atocha, the journey is continued over the Bolivia Railway Company's system, the working being in the hands of the Antofagasta and Bolivia Railway. Leaving Atocha at 2.30 p.m. on a Wednesday, the line follows the river, and ascends a steep gradient to Chocaya, where a fine view is obtained of the country surrounding Atocha. From this point the railway passes through deep cuttings in sandy earth. Between Chocaya and Uyuni, the railway passes over sandy desert, characteristic of the high Bolivian tableland.

Uyuni is reached at 6.40 p.m. on a Wednesday, and here passengers change for La Paz and Antofagasta. The train for La Paz leaves at 8 p.m. the same evening. Owing to better facilities in hotel accommodation in Uyuni, passengers proceeding to Postosi are advised to put up for the night in Uyuni, instead of continuing the journey to Rio Mulato, which is actually the junction with the line to Potosi, but all trains for that point start from Uyuni. Uyuni is a town of 5,000 inhabitants, the majority of whom are Indians. The junction of the Atocha branch is situated about 1 mile south of the station. At Uyuni transfer is made to the 2-ft. 6-in. gauge section of the Antofagasta & Bolivia Railway, which runs to Antofagasta on the Pacific coast. In order to effect this change passengers have merely to walk across the platform and enter the other train, which is waiting for them. There is a special apparatus for lifting through wagons bodily on to other bogies, an operation which takes about seven minutes. The station consists of one main and one island platform. The main platform serves the 2-ft. 6-in. gauge trains of the Antofagasta-Uyuni section, while the island platform serves the metre-gauge trains of the Uyuni-La Paz section. The Antofagasta & Bolivia Railway Company owns extensive repair shops for the locomotives and rolling-stock of the 2-ft. 6-in. gauge. These are situated at the north end of the station. Leaving Uyuni a very fine view is obtained on the right-hand side of the line, where a great range of snow-clad mountains rises abruptly from the tableland. The railway now runs along the high Bolivian plains at the height of about 12,000 ft. above sea level, between vast ranges of mountains. On the left side of the railway the mountains will be observed very much further away. After passing Chita, 30 miles from Uyuni, the mountains close in on the railway, although they are still from 8 to 10 miles away. Beyond Chita a river is followed, and the lower ranges of mountains close in on each side of the line. The railway follows the right bank of the river as far as Quehua. Rio Mulato is reached at 12.24 a.m. The town is small, and consists chiefly of Indian mud-brick houses.

Before continuing the description of the journey to La Paz, a brief account may be given of the journey between Rio Mulato and Potosi, a distance of 108 miles, during the course of which the railway passes through rugged mountainous country, and reaches an altitude of 15,809 ft. above sea level, being the second highest point reached by any railway in the world.

The Potosi branch leaves the main line to La Paz about a mile beyond Rio Mulato station, and curves sharply to the right in the direction of the mountains. The line leaves the tableland about 11 miles from Rio Mulato, and commences the five hours' climb to the summit of the "Cordilleras de Los Frailes" through desolate ranges of mountains, many of whose peaks are snow-clad. The progress of the train is very slow in many parts, owing to the steepness of the grades

Digitized by Google

Digitized by Google

encountered. The Potosi train is hauled from Uyuni to Potosi by a special type of locomotive of the 0-6-2-0-6-2 Kitson-Meyer built by Beyer Peacock & Company of Manchester in 1913.

At 3.15 p.m. the train arrives at Condor, which is probably the highest passenger station in the world, being 15,809 ft. above sea level. This height is only exceeded by the mining railway from Ollague to Collahuasi in Chile, where an altitude is attained of 15,814 ft. above sea level. From Condor to Agua Castilla the line falls rapidly, and there is little of interest to relieve the monotony of this mountainous desert, devoid of vegetation and very sparsely populated. At Agua Castilla is situated the famous "Porco" silver mine, which may be seen in the distance on the right side of the railway.

The line between Agua Castilla and Potosi runs more or less at a continuous elevation of 13,000 ft. above sea-level, and passes through deep gorges and rock cuttings. In parts, where the line passes through protected valleys, the vegetation is more apparent, being in the form of cactii and stunted bushes. Eighteen miles from Potosi, a magnificent panoramic view of vast mountain ranges presents itself. Potosi station is visible quite twenty minutes before the train is due to arrive there, as the railway descends slowly from a high elevation to the town.

Potosi is reached at 7.34 p.m. on Thursday evening. Cars meet the train, and convey passengers to the various hotels, which are some distance from the station. It may, perhaps, be of interest to note that Potosi was founded in the year 1546 by Don Juan de Villaroel Santandia. The famous silver mines of Potosi are situated in the Cerro, a mountain with a conical shaped peak, which stands behind the town, and rises to a height of 15,900 ft. The silver mines, although not so old as the "Porco" mine at Agua Castilla, have nevertheless been worked more or less continuously since the town of Potosi was founded. Potosi has a population of about 25,000 inhabitants, of whom more than half that number are Indians. Situated as it is, over 13,000 ft. above sea-level, the climate is never very warm at any time of the year.

Leaving Potosi at 10 a.m., the same line is traversed to Rio Mulato, which is reached at 8 p.m. the same evening. The sleeping car from Potosi to La Paz remains at Rio Mulato until 0·24, when it is attached to the international train from Uyuni to La Paz.

From Rio Mulato, the line passes through an arid desert, and nothing of interest is to be seen until Lake Poopó is reached. Lake Poopó is a large fresh water lake about 60 miles long and 20 miles broad. The curious feature regarding this lake is that although many rivers flow into it, it has but one small outlet at its northern extremity, connecting with the famous Lake Titicaca.

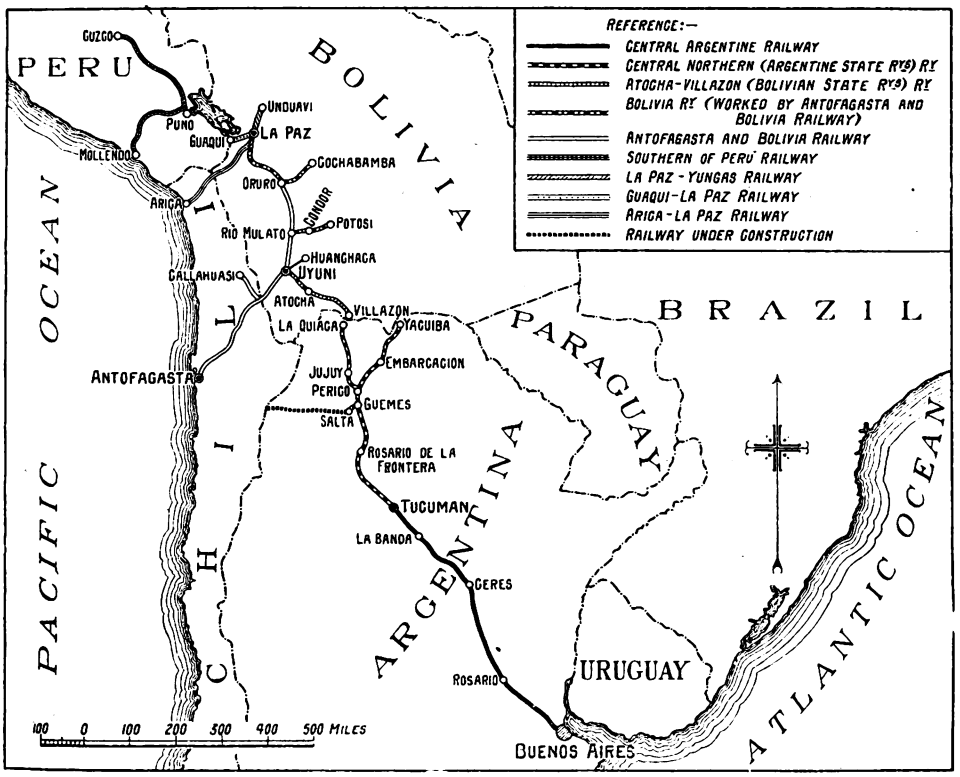
The International Train arrives at Oruro at 7 a.m. on a Monday morning, and waits 15 min. in order to detach several sleeping cars. The platform is usually crowded with people, and the many coloured dresses of the Indian women, add to the picturesqueness of the scene. Oruro is situated at a height of 12,300 ft. above sea-level, and is the most important tin mining centre in Bolivia. The population is about 28,000 inhabitants, and about the same proportion of Indians as in Potosi.

Thirty-eight miles from Oruro is Eucaliptus, near which are situated the mines of Monte Blanca at the height of over 16,000 ft. above sea-level. Continuing the journey, most of the stations between Oruro and La Paz are connected with mining, and little need be said about them. At Viacha, a small town 12,657 ft. above sea-level, and about 23 miles from La Paz, a connection is effected with the Arica and La Paz Railway, and the Guaqui and La Paz Railway. The former connects La Paz with Arica on the Pacific Coast, while the latter connects La Paz with Guaqui, a small town situated on Lake Titicaca. The Arica and La Paz trains are worked into La Paz by the locomotives of the Antofagasta and Bolivia Railway, while the Guaqui and La Paz Railway has its own electrified line from Alto to La Paz (Central).

The line between Viacha and Kenko drops gradually, and just beyond Kenko Station, the descent to La Paz commences. About half a mile from Kenko the tableland falls abruptly away, disclosing a deep valley, and a magnificent view of the snow-clad peak of Illimani, 21,000 ft. high.

Digitized by Google

Digitized by Google



MAP OF ROUTE DESCRIBED.

The railway, after descending rapidly through several tunnels and deep cuttings, follows the western slopes of the valley for several miles. The embankments have in many cases been reinforced owing to their liability to be washed away by the torrential rains.

The International Train arrives at La Paz (Chijini) at 2.25 p.m. on a Thursday. From a traveller's first impression of the station one can hardly realise that the capital of Bolivia has been reached. Chijini station, which lies on the western slope of the valley, overlooking La Paz, has only a single platform, and a small wooden station building. There are, however, extensive sidings and warehouses in the vicinity. In addition to the Antofagasta and Bolivia Railway, the La Paz and Yungas Railway (State-owned) runs into Chijini station, from Unduavi on the north side.

The city of La Paz with a population of about 100,000 inhabitants, is probably the highest capital in the world. Although standing at a height of 12,000 ft. above sea-level, the city lies in a valley, 1,000 ft. deep, and is surrounded by high mountains. The giant snow-clad peak of Illimani stands like a sentinel over the city. From Chijini station one is able to obtain an excellent birds-eye view of La Paz and its surroundings. Among the principal edifices in the city are the Congress Hall, and a fine Cathedral, which is in course of construction. There is a good tram service in La Paz, the routes mainly radiating from the Chijini station.

In conclusion, the writers would certainly recommend any readers, who have an opportunity of visiting the Argentine Republic, to endeavour to make the journey between Buenos Aires and La Paz, which gives one an excellent opportunity of viewing the Andes, and inspecting the working of railways in an extremely wild and mountainous district, and under difficult conditions.

Digitized by Google

THE RAILWAY PORTRAIT GALLERY.

Lafayette] [*Dublin*

MR. C. E. RILEY,

General Manager, Great Southern Railways, Ireland.

MR. C. E. RILEY, who has been appointed to succeed Mr. M. F. Keogh as General Manager of the Great Southern Railways Company (Ireland), was educated at High School, Dublin, and holds the degree of Master of Arts in Dublin University. As a young man he worked a short time in the engineering shops of the Great Southern and Western Railway, and afterwards served in the Traffic and Audit Departments. He was appointed Assistant Accountant in 1898, in 1913 was made Accountant, and was a member of the Permanent Committee of Accountants at Westminster. During Government control he was Chairman of the Accountants' Committee of the Executive Committee which administered the financial side of the Government's control of the Irish railways. In 1923, on the death of Mr. Robert Crawford, he was appointed Secretary and Accountant of the Great Southern and Western Railway, and on amalgamation was made Secretary of the Great Southern Railways Company.

Digitized by Google

Photo.] [*W. H. C. Kelland.*

OUEST-ÊTAT 4-6-2 LOCOMOTIVE NO. 231.694 PASSING POISSY.

The Chemin de fer de l'État in Normandy.

By J. MACARTNEY ROBBINS.

MOST of the principal express trains of the Chemin de fer de l'État are hauled by 4-6-2 "Pacific" locomotives. These machines are compounds, and have four cylinders. They are to be found at all the chief locomotive depôts of the railway. The Paris to Havre trains are usually worked throughout by "Pacifics" stabled at either the Batignolles sheds at Paris, or Havre. The Cherbourg trains, on the other hand, have their engines changed at Caen, where there is a large depôt. Caen supplies engines for trains working to or from Paris and Cherbourg. This arrangement also applies to the trans-Atlantic boat "rapides." At Cherbourg, the large engines proceed along the quays to the Gare Maritime, where passengers embark on to the tenders to take them to the ocean-going liners, at anchor in the outer harbour. In the reverse direction, the "Pacifics" haul the trains from the quay station to Caen. The engines are supplied from Cherbourg or Caen depôts. Some of the Pacifics have been constructed by the North British Locomotive Company at Glasgow, and, in fact, quite a number of locomotives belonging to the Chemin de fer de l'État have been built in Britain, including 4-6-0's, 4-4-0's, and 2-8-0's. The trans-Atlantic boat trains are usually composed of bogie corridor stock, often with a "blue" dining car, the property of the International Sleeping Car Company, marshalled in the train set. Occasionally, some old four-wheeled corridor vehicles, mounted on four-wheeled frames, are used.

The "Pacific" type engine is ubiquitous on the État system, as numbers appear to work in and out of the Montparnasse station in Paris, on heavy trains bound for Brest and Bordeaux. The Brest trains are worked to Laval, a distance of 301 km. from Paris, by the engine from Paris. A change is made at this point, the relieving engine, belonging to Laval or Brest shed taking the train on to its destination.

Digitized by Google

For working main-line locals and semi-fasts, a 4-6-0 compound is used; this class of engine was used on the expresses until the advent of the "Pacific." These 4-6-0's. are to be found at nearly every shed of any importance in Normandy. Occasionally some 4-4-0's of the "de Glehn du Bousquet" type take their turns on these trains.

Some 4-6-0 compounds having four cylinders, but formerly the property of the old État administration, have found their way into Normandy, and appear to be stationed at Mézidon and Argentan. They work the through Rouen to Le Mans trains, and also take their turn on the trains running between Paris (Invalides) and Granville. Apparently the "Pacifics" are not used on this section; the expresses being hauled by these 4-6-0's, or a simple type of superheated 4-6-0, which were designed and built shortly before the war.

The freight trains appear to be worked by various classes of engine, chiefly 2-8-2's, 2-8-0's, or 0-8-0's. A few of the 2-8-2's are fitted with a feed water heater, similar to that found on the 4-6-2's belonging to the Nord and P.L.M. railways. The État has also fitted some of their "Pacifics" with this device. A number of engines of the 0-8-0 and 4-6-0 type, formerly the property of the Prussian State Railways, are to be found at work on this system, and occasionally some belonging to the Bavarian and Saxon railways.

Besides these modern locomotives, a number of interesting engines, chiefly 4-4-0's, 2-4-0's and 0-6-0's are to be found, either engaged in shunting operations, or at work on branch lines. Some of these date as early as 1857; one in particular which was noted was a 0-6-0, with inside cylinders, but outside motion, at work on the quays at Cherbourg. It was built by a Paris firm, Ernest Gouin and Cie, in 1857, but had been rebuilt at the work-shops of the old "Ouest" Company at Sotteville, near Rouen in 1887.

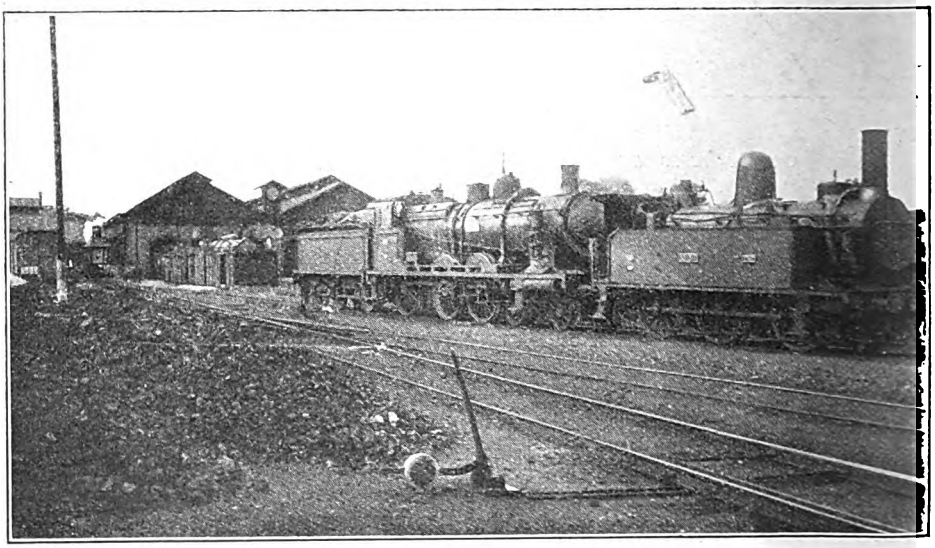


Photo.] [*J. Macartney Robbins.*

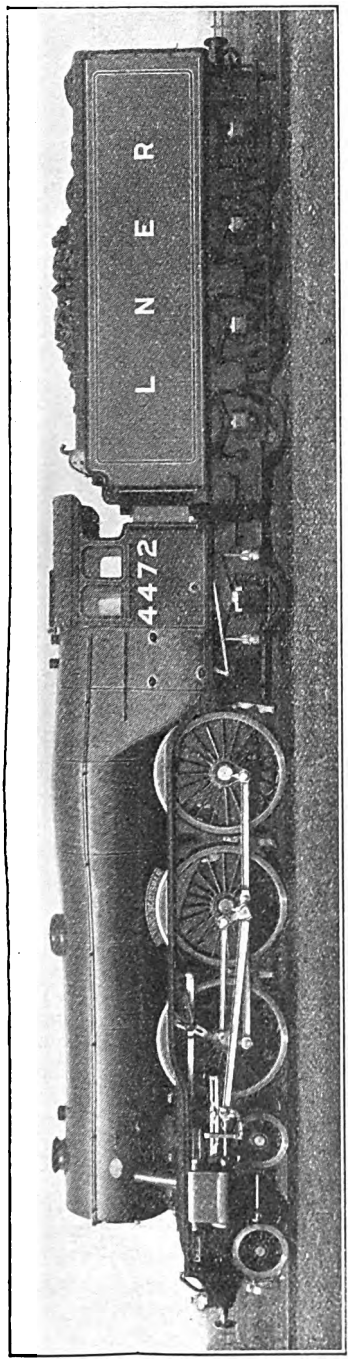
FRENCH STATE RAILWAY LOCOMOTIVE DEPOT AT ARGENTAN.

The carriage stock on the whole is good. The expresses usually consist of modern and up-to-date bogie corridor vehicles, some of which are composed of steel bodies, with centre and end doors. The semi-fasts and locals usually consist of long-wheel base four-wheelers, with corridors and lavatory accommodation, but have no gangways at the ends. Sometimes, however, some really old four-wheeled coaches are provided, the thirds having no windows except for the one over the door, shady on a hot day, but that is all that can be said for them.

Digitized by Google

London to Edinburgh Non-Stop.

NEW L.N.E.R. TRAIN SERVICES AND THE FIRST CORRIDOR TENDER.



GENERAL VIEW OF 4-6-2 LOCOMOTIVE FITTED WITH NEW TENDER.

As from May 1, the London and North Eastern Railway will inaugurate non-stop running between King's Cross and Edinburgh, 392·7 miles, in each direction, a world's record so far as publicly-scheduled express trains are concerned. Last year the L.N.E.R. ran a train non-stop between King's Cross and Newcastle, but, whereas this was the relief portion of "The Flying Scotsman" and ran four days a week during the height of the summer season only, the new booking will apply to "The Flying Scotsman" itself, will affect the Aberdeen as well as the Edinburgh sections, and will run each week-day during the spring as well as the summer months. To meet intermediate requirements there will be a new train from King's Cross at 10.5 a.m. (10.15 a.m. from Waverley in the up direction), taking the Glasgow and Perth sections, together with Aberdeen coaches, and as the second train will give all the usual connections, there will be no loss of standard facilities. No doubt, however, speed advocates will regret that the L.N.E. and L.M.S. Companies have not seen their way, so far, to modify the "agreement" which, it is alleged, prevents any acceleration on the standard 8¼ hours between London and Edinburgh, in that there is no reduction in journey time. This at first sight is anomalous, as the second part of the L.N.E.R. train takes the same time, though including the usual stops at Grantham, York, Newcastle, and Berwick. On the other hand, if the London-Edinburgh non-stops are to run only in the summer months it may not be considered good policy to have, say, half-an-hour's difference in the quickest London-Edinburgh timings in the summer and winter services. The L.N.E.R. is, however, very much to be congratulated on its enterprise in scheduling the London-Edinburgh non-stop run as a daily performance each way, and for the ingenuity displayed in devising the first "corridor" tender whereby it is rendered practicable.

The popularity of the non-stop run to Newcastle, which was a feature of the

Digitized by Google

Digitized by Google

ENDER CORRIDOR, LOOKING TOWARDS FOOTPLATE.

East Coast Anglo-Scottish services last year, made it clear that there is a considerable public demand for improvements of that kind, and the London and North Eastern Railway have for some time been exploring the possibility of extending the distance covered without stopping. It was felt that the limit of the powers of a single engine crew had been reached, and that it was undesirable on grounds of safety to carry two crews on one engine. Some method had, therefore, to be devised by means of which engine crews could be changed *en route*, and the provision of a corridor on the tender supplied the solution to the problem.

This has now been carried into effect, and two of Mr. Gresley's three cylinder Pacific-type engines, *i.e.*, 4472 *Flying Scotsman* and 4476 *Royal Lancer*, have been fitted with the new tenders. These will be employed for inaugurating the new London-Edinburgh non-stop runs commencing on May 1, and eight other engines of the same class will be similarly equipped. The driver and fireman in charge on leaving London will be relieved as the train passes Tollerton, 197½ miles from King's Cross, or, roughly, half-way on the journey, the off-duty crew riding in the foremost third-class compartment in the train. On reaching the change-over point the relief crew will pass through the brake van next the engine, and by means of the vestibuled connection with the tender, enter the corridor leading to the footplate, those coming off duty passing back to the train in a similar manner.

The necessity of using a good class of coal on a run of this magnitude is obvious, and a point in this connection is that the engines are equipped with shaking grates. The gangway, or corridor, is located on the right-hand side of the tender looking forward, and entirely covered in. It has a width of 18 in. and a height of 5 ft. Steps at each end of the tender afford access from the level of the gangway or corridor to that of the engine footplate at the front and the vestibule flooring at the rear. Circular windows are provided, one at each end of the corridor, for lighting the interior, and the position of these can be seen in some of the accompanying illustrations. The whole arrangement is neat and compact.

The tender is of the eight-wheeled pattern with rigid axles, and weighs in working order 62 tons 8 cwt., as compared with 56·5 tons of the original standard tender, the coal capacity of which was, however, 8 tons in place of 9 tons. A door is provided at each end of the corridor on the tender.

ANOTHER interesting feature of the new L.N.E.R. time-tables, which will apply from

Digitized by Google

Digitized by Google

British Locomotive Practice and Performance.

By CECIL J. ALLEN, M.Inst.T., A.I.Loco.E.

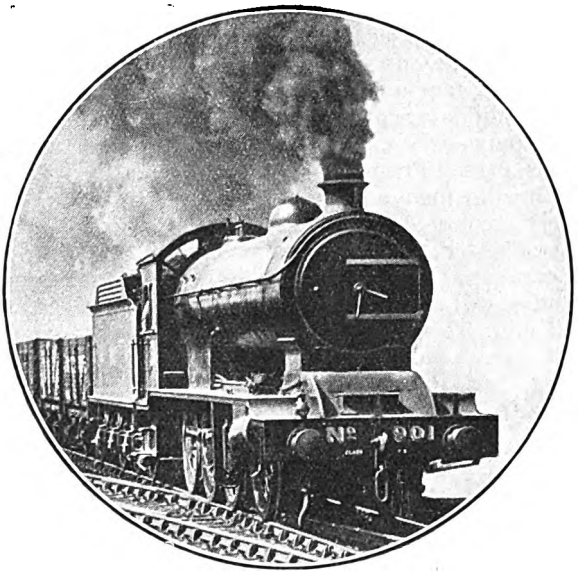


Photo.] [*W. Rogerson.*

COAL TRAIN PASSING COWTON, L.N.E.R.

N.E. 0-8-0 Locomotive No. 901.

A GREAT deal of correspondence has reached me in connection with the *résumé* of the current performance of the L.M.S. "Royal Scot" locomotives, appearing in my February article, and I will begin by reproducing extracts from a few of these letters. One reader living near the Western Division main line at Rugeley, writes thus: "Your eagerly-awaited 'Royal Scot' runs confirm impressions that I had formed after watching the passage of these engines for the past few months. I am sure you are right in attributing the anomalies of their work to wrong methods of driving; the variations in the manner of their passing here have, indeed, been most striking. In the first few weeks of the Euston-Carlisle non-stop run, with the full 15-coach load, the 'Royal Scot' usually cleared Rugeley at about 60 m.p.h. in practically noiseless fashion, yet the following 10.7 a.m. Aberdeen express, with 7 or 8 coaches and the same type of engine, often heralded its approach in a manner reminiscent of a *George* or a *Prince* of the late L. & N.W.R. The up Aberdeen express mentioned in your article has, during the winter, shown similar variation; at times, with 13 coaches, the running of the *Royal Scot* engine has been impressively silent, while at others, with only 11 or 12 vehicles, the noise of the exhaust could be heard a long way off, and the rain of hot cinders, as the train passed this station, has strengthened the onlooker's belief that the driving was at fault. Again, the comments of various drivers on the engines would seem to indicate the same condition of things. I have been told that they are 'beauties,' 'grand engines,' 'not so bad,' 'middling,' 'not up to much,' and 'nothing to beat a good *Claughton* or a *Prince*,'—all from drivers who were driving or had driven *Royal Scot* locomotives."

From a reader who is both widely-travelled and an expert recorder of railway running, I have received the following: "I had a lot of *Royal Scot* runs ready to send you, but really they are not worth it, and your own trips just published bear me out. There was one to Crewe on the 10.30 a.m. down which was of interest —No. 6144, with 472 tare tons, took as much as 44 min. 52 sec. to Tring, 60 min. 17 sec. to Bletchley, and 95 min. 52 sec. to Rugby, but then got through Nuneaton in 112 min. 26 sec., Tamworth in 123 min. 40 sec., Rugeley in 136 min. 53 sec., Stafford in 146 min. 6 sec., and Whitmore in 161 min. 54 sec., and arrived at Crewe

Digitized by Google

in 173 min. 42 sec. Other runs all show a slight loss, as do most of my up journeys. I had a trip northwards from Crewe on the 'Midday Scot' that was very similar to yours—when No. 6128, with 308 tare tons, passed Preston in 54 min. 37 sec. (the Polmadie men usually do this, but it is very senseless, as the 4.15 p.m. from Manchester to Windermere has a bare clearance at Carnforth if the 1.30 is on time) and did Lancaster to Shap Summit in 52 min. 32 sec. This included a time of 10 min. 6 sec. for the 7¼ miles up Grayrigg, but there were bad signal delays going down to Carlisle. That up Aberdeen express to which you refer is usually a miserable show, and the load from Carlisle to Preston, with a total allowance of 17 min. over the pre-war time, does not make for inspiring running."

"Having read your remarks in past issues on the subject of the 'Royal Scot' trains and the locomotives working them, with which I entirely agree," writes another correspondent of long-standing, "I venture to send you particulars of a run on the down 'Royal Scot' express during last Christmas week. After the somewhat lavish advertisement bestowed upon the train in question, I am bound to admit that the locomotive performance was singularly poor, making all allowance for certain delays in the earlier part of the run. The engine detailed for the duty (No. 6126) may have been out of condition, or the Camden driver faint-hearted; I merely record what happened on that day. Our load was a 12-coach train weighing 346 tare tons. Owing to fog, the start was 9¼ min. late, and by reason of several signal checks and a dead stand of 65 sec. at Sear's Crossing box near Leighton, we were 25¼ min. behind time on passing Stafford. The fog had dispersed by the time we passed Bletchley, but there seemed little effort made to regain lost time. North of Stafford a clear road was obtained, but, apart from a gain of 3¼ min. between Stafford and Preston, time was lost on schedule rather than regained, and we reached Carlisle 24¼ min. late. One could not help thinking that by the time Carnforth was reached the engine was beginning to feel the strain of things. Of the ascent from Oxenholme to Shap Summit the less said the better; it occupied exactly 35 min., and the climb of 5⅝ miles from Tebay up to Summit took no less than 14 min. 19 sec. Even the final downhill 31¼ miles into Carlisle could produce nothing better than 33 min. 16 sec., a loss of 1¼ min. on schedule.

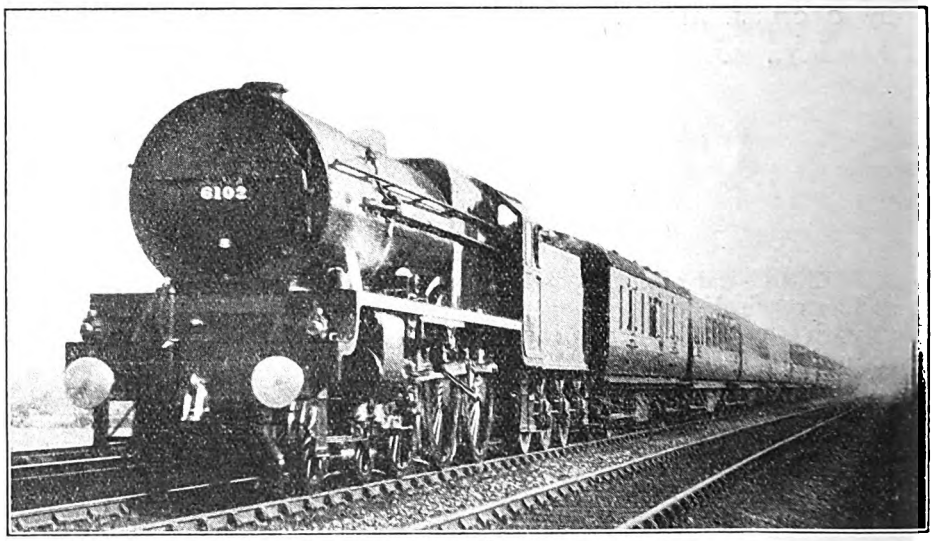


Photo.] [*W. Leslie Good.*

DOWN "ROYAL SCOT" EXPRESS NEAR TAMWORTH.

Three-cylinder 4-6-0 No. 6102.

Digitized by Google

One could but conjecture what would have been the loss on that day had the full load of 440 tons been attempted.

"Fortunately there was an improvement after Carlisle, as we there exchanged No. 6126 for No. 6132, driven by Gibson, of Polmadie, who made for himself such a reputation with the famous *Cardean* in days gone by. Despite the fact that it was now raining hard, Gibson passed Beattock in 45 min. 28 sec., climbed the noted bank to Summit in 20 min. 14 sec., and reached Symington in 82 min. 58 sec. from Carlisle, instead of the 87 min. allowed. One would like to have recorded a little brisker running from Summit, but possibly the boiler needed re-filling after the hard climb. With the load reduced to 222 tare tons, No. 6132 ran from Symington to Glasgow in 44 min. 23 sec., making a total time of 129 min. 36 sec. from Carlisle, for which the working book allows 140 min. The arrival at Glasgow was effected a shade after 6.25 p.m., 15 min. late according to the working time, and 10 min. behind the public time. This was a very uninspiring trip, save for the part of the journey north of the Border. From the point of view of publicity and advertisement, the London-Carlisle non-stop run is no doubt a fine thing, but from the standpoint of practical locomotive working the original plan of changing engines at Carnforth seems the more commendable. The mileage covered by the two engines required to work the train is the more evenly divided by the latter arrangement, while the Northern Division engine has the advantage of tackling the severe ascents of Shap with a clean fire, which is not possible under present conditions." With such a comment as this I am in hearty agreement.

I now come to a letter which gives some singularly enlightening comment on the new engines. "I have been waiting to see you deal with the work of the *Royal Scots* for some time past," the writer begins, "but I am intensely disappointed in the quality of the runs, and I fully agree that the engines are not being driven properly. When the engines first came to Crewe, it was difficult to get drivers to open their regulators and to notch up well, but some of them took to it like a duck to the water. Of course, in those early days, we never had big loads or long runs, but even so one could see what the engines were really capable of. The most memorable footplate trip that I had was one from Crewe to Euston on the 7.54 a.m. up Fleetwood boat express. It was only a few hours previously that the engine had arrived from London, and this prob-

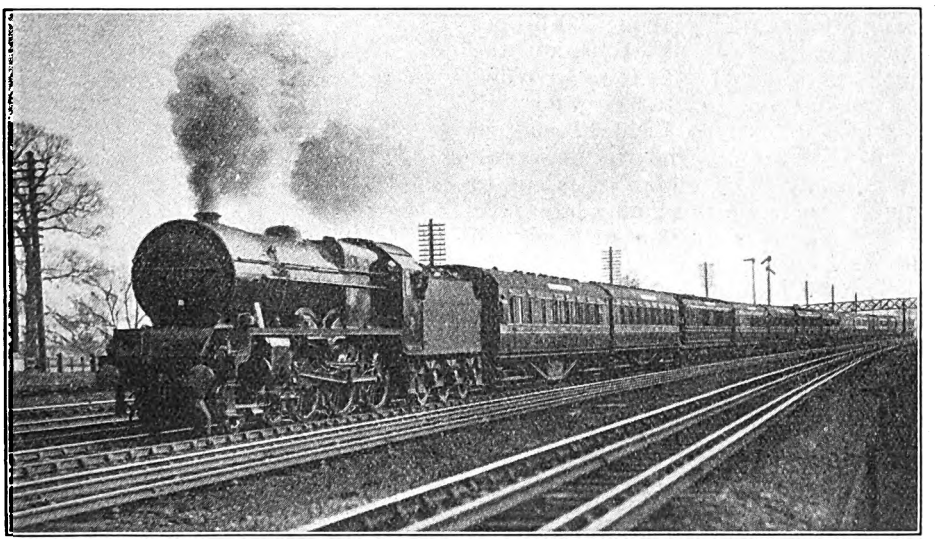


Photo.] DOWN "MIDDAY SCOT" EXPRESS. [*F. R. Hebron.*

Three-cylinder 4-6-0 No. 6111 "Royal Fusilier."

Digitized by Google

ably accounted for the fact that she did not steam quite so well as she ought. The fireman had had one previous trip on a *Royal Scot*, but not so the driver, who had never been on one before. Suffice it to say that we left Crewe 6 min. late, but reached Euston on time, and that despite a signal stop outside.

"Full regulator was used throughout the run, with cut-offs of roughly 15 per cent. from Crewe up to Whitmore, 10 per cent. thence to Stafford, 15 per cent. from Stafford to Rugby, 18 per cent. from Rugby to Roade, 14 per cent. thence to Tring, and 10 per cent. onwards to Euston. Boiler pressure was steady for most of the distance at about 200 lb. per sq. in. Tare load was 312 tons, and the times were 17 min. from Crewe to Whitmore and 30 min. to Stafford stop; 19 min. from Stafford to Lichfield and 56 min. to Rugby stop (the working book allowance here is 66 min., but is cut to 58 min. if the train is running late); 25 min. (a remarkable time) from Rugby to Roade, 37 min. to Bletchley, 54 min. to Tring, and 88 min. to Euston, or 86 min. net, making a total gain to engine of 6 min. The point was the superb ease with which the locomotive worked, and, indeed, the smooth and noiseless running of this huge machine was very impressive. It only remains to be said that the engine was perfectly cool at the end of the run. I could go on quoting footplate experiences, but mine have always been the same—full regulator and early cut-off, enthusiasm; partly shut regulator and late cut-off, no 'go' in the engine at all. In my own mind there is no shadow of a doubt that the 'Royal Scots' are very fine engines."

One of the most interesting side issues ar sing out of this letter is that the engine concerned did her work with a pressure ruling at about 200 lb., instead of the rated 250 lb. This is but another indication of the singular susceptibility of these high-pressure designs to variations in running conditions, of which there have been reminders recently in my recorded experiences on the G.W.R. 250 lb. *King George II* and the L.N.E.R. 220 lb. *Enterprise*.

Since writing my article of two months ago, I have enjoyed a considerably better run than previously on the heavily-loaded 10.30 a.m. down express, which is reproduced herewith, together with a run on the same train timed by a correspondent. In both cases a 68-axle formation was taken, with a gross load exceeding 500 tons, and the "Royal Scot" engine employed—No. 6107—was the same on both trips, which were made remarkable by the

L.M.S. 10.30 A.M. EUSTON–CREWE.

Distance.	Engine No. ..	Schedule.	6107	6107
	Load (axles) ..		68	68
	,, (tons tare)		482	492
	,, (,, full)		505	515
miles.		min.	m. s.	m. s
0·0	Euston	0	0 00	0 00
1·2	Camden	—	—	4 30
5·4	Willesden ..	10	11 00	10 35
8·1	Wembley ..	—	14 10	13 40
11·4	Harrow	—	18 10	17 30
13·3	Hatch End ..	—	20 30	19 40
				sigs.
17·5	Watford.. ..	24	25 25	25 30
21·0	King's Langley	—	29 10	31 30
24·5	Boxmoor ..	—	33 00	35 40
28·0	Berkhamsted	—	36 50	39 35
31·7	Tring	40	41 00	44 05
36·1	Cheddington ..	—	45 05	48 15
40·2	Leighton ..	—	48 30	51 35
46·7	Bletchley ..	54	54 05	57 10
52·5	Wolverton ..	—	59 05	62 15
59·9	Roade	67	66 25	69 30
62·9	Blisworth ..	70	69 30	72 35
69·8	Weedon.. ..	—	75 50	78 55
75·3	Welton	—	81 40	84 40
			sigs.	
82·6	Rugby	92	91 40	92 40
83·2	Rugby No. 7..	—	93 00	93 45
88·1	Brinklow ..	—	99 05	99 30
91·4	Shilton	—	102 45	103 05
93·5	Bulkington ..	—	104 50	105 10
97·1	Nuneaton ..	108	108 15	108 30
102·3	Atherstone ..	—	112 50	113 15
106·5	Polesworth ..	—	116 30	117 00
			p.w.s.	
110·1	Tamworth ..	122	120 50	120 20
			p.w.s.	
116·3	Lichfield ..	128	130 25	126 20
121·1	Armitage ..	—	136 50	131 20
124·3	Rugeley.. ..	136	140 10	134 20
127·2	Colwich	—	143 05	137 15
129·6	Milford	—	145 25	139 40
133·6	Stafford.. ..	146	150 05	144 30
136·9	Gt. Bridgeford	—	154 10	148 30
138·9	Norton Bridge	153	156 25	150 45
143·5	Standon Bridge	—	161 10	155 50
147·6	Whitmore ..	164	165 40	160 30
150·2	Madeley.. ..	—	168 20	163 20
153·4	Betley Road ..	—	171 10	166 20
			sigs.	
158·1	Crewe	175	177 00	172 00
158·1	Net times (min.)	175	168	168

Digitized by Google

astonishingly close correspondence of their running times. On my run we lost 1½ min. to Watford, but were in front of schedule by Roade. We made one of the leisurely starts so reminiscent of Paddington—and typical also, no doubt, of high-pressure locomotives, while the cylinders are getting warmed up—not exceeding 52 m.p.h. before Wembley. But we reached 62½ an hour at Watford, and thereafter went finely up the 1 in 330 to Tring, passing King's Langley at 55½ m.p.h., Boxmoor at 54 and Berkhamsted at a well-sustained minimum rate of 53. On the second run there was a very bad check through Watford, after the driver had obtained a lead of nearly a minute on the first trip, but speed recovered up the 1 in 330 to 51½ m.p.h. at Berkhamsted—a fine achievement.

From Tring to Rugby there was an almost uncanny similarity between the times of the two runs, with no greater divergence than five seconds up or down at any point. Speeds, too, tied exactly on both trips —72½ at Cheddington, 70½ at Leighton, 67½ at Bletchley, 70½ at Wolverton, 54 at Roade, 65 at Weedon and 52½ at Kilsby Tunnel—I have never previously known such "level pegging" as this over a distance of more than 50 miles. Outside Rugby my run was very badly checked, so that we lost 2 min.; otherwise we should have passed Rugby in under 90 min. Again, after Rugby there was very even travelling, with the second run from 15 to 30 seconds behind the first between Brinklow and Polesworth, where my run was badly checked again by the reinstatement of the Polesworth pitfall slack. After this we had a desperately bad relaying slack between Tamworth and Lichfield, so that it appeared unlikely that we should succeed in reaching Crewe on time. Actually, however, we managed to pick up 4½ min. between Rugeley and Whitmore, and despite a slight signal check outside Crewe, were only 2 min. "down" on arrival. On the second trip, on the other hand, the arrival was 3 min. early. It is easy to assess the net times on these two journeys, which tie at 168 min., or 7 min. under schedule time. Speeds north of Rugby were 68 m.p.h. on both runs at Nuneaton, 64 on the second run at Polesworth and 55 up the rise beyond Lichfield, 60½ and 64 before Rugeley, 60 and 56 minimum at Milford, 40 on both runs over Trent Valley Junction, 55½ and 54 at Norton Bridge, 55½ (maintained throughout up the rise) and 50½ before Whitmore, and 71½ and 69 at Betley Road.

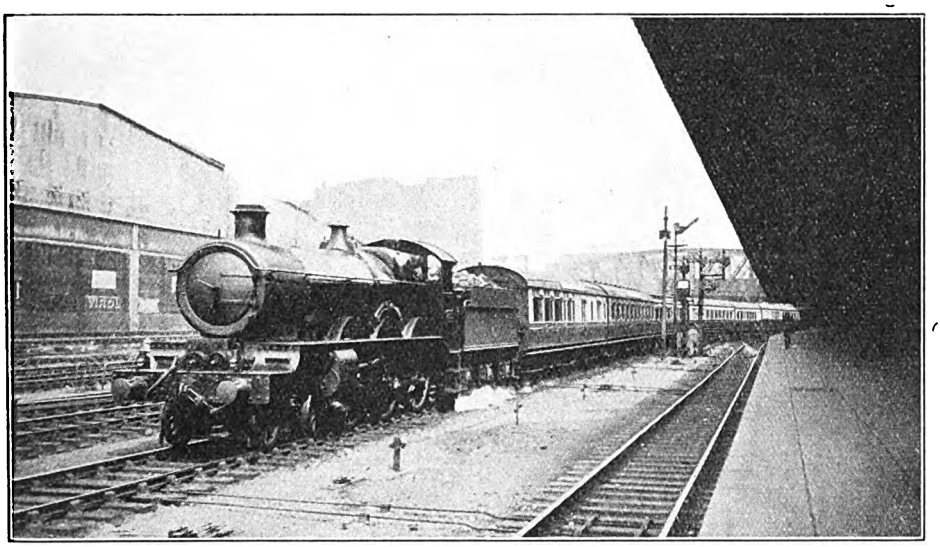


Photo.] [*G. H. Marillier.*

SOUTH WALES EXPRESS LEAVING PADDINGTON, G.W.R.

Four-cylinder 4-6-0 No. 4035 "Queen Charlotte."

Digitized by Google

On the second run the engine was slightly eased, and justifiably, after Stafford, the better work of the first run here balancing its slightly slower start out of Euston. These were two excellent trips.

Among other good "Royal Scot" journeys of which I have been advised, a correspondent timed No. 6126—the engine whose work on the down "Royal Scot" express has been adversely criticised earlier in the present article—to make some good times from Crewe to Euston on the up "Merseyside Express," with a 50-axle train weighing 364 tons empty and 390 tons full. Despite a signal check at Betley Road, No. 6126 passed Whitmore in 17¾ min., and Stafford in 31 min., with a maximum rate of 69 an hour at Great Bridgeford. Between Stafford and Rugby the work was devoid of note, the times being 10 min. 40 sec. from Stafford to Rugeley, 13 min. 40 sec. thence to Tamworth, 13 min. 25 sec. on to Nuneaton, and 14¾ min. from Nuneaton to Rugby, making a total of 52½ min. over this length of 51 miles. But from Rugby to Willesden the running was a little more energetic, with speeds of 72 m.p.h. at Weedon, 60 (minimum) at Roade, 70½ at Castlethorpe, 54 at Tring and 76 at Boxmoor, after which the engine was eased. Times were 15 min. from Rugby to Weedon, 9½ min. from there to Roade, 12 min. 25 sec. on to Bletchley, 15 min. 35 sec. thence up to Tring, 12 min. 55 sec. from Tring to Watford and 12 min. 5 sec. from Watford to Willesden—a total of 77½ min. for the 77·2 miles from Rugby to Willesden, and 161 min., or 159 min. net, for the 152·7 miles from Crewe. Euston could have been reached in 167 or 168 min. (165 or 166 min. net) but for a couple of signal stops inwards from Willesden, which made the total time 174½ min. This was still half a minute inside schedule, but it cannot be disputed that the latter is an excessively easy allowance over so perfect a road.

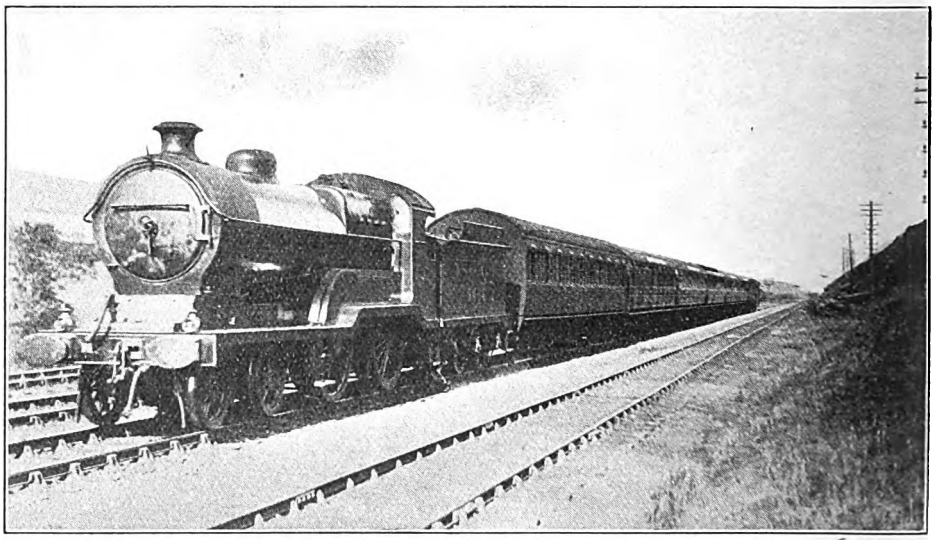


Photo.] [*H. Gordon Tidey.*

LONDON-MANCHESTER EXPRESS, L.N.E.R. (G.C. SECTION.)

4-4-0 No. 5436 "Sir Berkeley Sheffield."

Yet another correspondent sends details of a remarkable run on the same express in the opposite direction of working, for which the *Royal Scot* himself was responsible. The load was the standard formation of 46 axles, weighing full about 340 tons. There was a stop for adverse signals, lasting ½ min., before the train had even passed Camden, but No. 6100 got through Willesden in 11 min. 10 sec. and Watford in 23¾ min., after which an average of all but 60 m.p.h. was maintained up to Tring, with a time of 14 min. 20 sec. for the 14·2 miles. But this energy,

Digitized by Google

carrying the express through Tring in 38 min. 5 sec., resulted in delay from the preceding 5.50 p.m. Birmingham train, and the "Merseyside Express" was for a second time stopped by signal, between Cheddington and Leighton, so taking 57 min. 35 sec. to pass Bletchley.

From here, however, the 111·4 miles to Crewe, Rugby and Stafford slacks included, were compassed in the fine time of 109½ min. Bletchley to Roade took 12 min. 35 sec., Roade to Weedon 8 min. 40 sec., and Weedon to Rugby 12 min.—total 33¼ min. for 35·8 miles, and a most unusual time for this stretch. From Rugby on to Nuneaton occupied 16 min. 55 sec. Nuneaton to Tamworth 10 min. 25 sec.—*average* 74·4 m.p.h.—Tamworth to Rugeley 12 min. 35 sec., and Rugeley to Stafford 8 min. 35 sec., making a gross time of 139 min. 20 sec. from Euston. From Bulkington to Milford the time of 30 min. 40 sec. for 36·1 miles, with its throughout average of 70·6 m.p.h., was also very much out of the ordinary. Things were then taken more easily, with times of 15 min. 20 sec. from Stafford to Whitmore, 12 min. 25 sec. thence to Crewe, 16 min. 25 sec. on to Acton Bridge (14·4 miles), 9 min. 10 sec. from there to Runcorn (8·1 miles), and 11 min. 10 sec. from Runcorn to the Mossley Hill stop (9·1 miles), which was made in 203 min. 50 sec. from Euston (189·7 miles), or 2¼ min. inside schedule time. After 50 sec. standing, *Royal Scot* reached Edge Hill in 211 min. 20 sec. from London. I should calculate the net times, allowing for the two signal stops on the basis of 2 min. for the first and at least 7 min. for the second, at 36 min. to Tring, 48½ min. to Bletchley, 81¾ min. to Rugby, 109¼ min. to Tamworth, 130¼ min. to Stafford, 158 min. to Crewe, 194¾ min. to Mossley Hill stop, and 202¼ min. to Edge Hill stop. On such running as this—a notable exhibition of the real tractive powers of a "Royal Scot"—a non-stop journey could be made from Euston to Lime Street in 3 hrs. 20 min., in place of the present "best" of 3 hrs. 40 min.

Photo.] [*E. A. Gurney-Smith,*

LEICESTER-MARYLEBONE TRAIN PASSING NORTH HARROW.
4-4-0 No. 5501 "Mons."

But now let me hasten on to those promised journeys over the Great Central section of the L.N.E.R. No disparagement was intended in my remarks concerning the locomotive work over this section which appeared in the last issue; far from it. In proportion to the size of the engines employed, the performance required on the chief expresses south of Sheffield over this main line is among the hardest in the country, even with allow-

Digitized by Google

ance for the relative lightness of the loadings. But, as I said, there is little to record that has not been recorded many times before in these columns, except, possibly, for the advent of some of the large 4-cylinder 4-6-0 engines on duties hitherto performed exclusively by "Directors." I fancy that the former engines were removed from the Pullman workings over the Great Northern section owing to the fact that their coal consumption was in excess of that of the Great Northern "Atlantics" employed on the same duty, and also on account of their running short of steam at times (of which I had one experience myself), the exceptionally small fire-grates of these engines, in proportion to the size of their boilers, being unsuitable for long non-stopping runs.

I have tabulated, first of all, a couple of excellent runs with "Directors" on the 3.20 p.m. down Manchester express, one

L.N.E.R. 3.20 P.M. MARYLEBONE–LEICESTER.

Distance.	Engine 4-4-0 No. Load (axles) .. ,, (tons tare) ,, (,, full)	Schedule.	5502 24 204 215	5433 24 211 225
miles.		min.	m. s.	m. s.
0·0	Marylebone ..	0	0 00	0 00
5·1	Neasden Jc. ..	9	8 30	8 30
9·2	Harrow ..	14	12 35	12 36
11·4	Pinner ..	—	14 50	14 59
13·7	Northwood ..	—	17 10	17 30
17·2	Rickmansworth	23	20 40	21 06
19·4	Chorley Wood	—	23 50	24 37
21·6	Chalfont Rd. ..	29	27 10	27 59
23·6	Amersham ..	—	30 10	31 05
28·8	Gt. Missenden	36	35 20	36 06
33·3	Wendover ..	—	40 05	40 36
38·0	Aylesbury ..	46	44 15	44 32
44·1	Quainton Rd. Jc	53	50 10	50 34
46·8	Grendon Jc. ..	—	52 55	53 18
48·8	Calvert ..	—	54 50	55 07
54·5	Finmere ..	—	60 30	60 43
59·3	Brackley ..	—	65 20	65 34
62·5	Helmdon ..	—	68 50	69 07
			p.w.s.	
66·1	Culworth ..	—	73 10	72 38
69·1	Woodford ..	77	76 10	75 15
71·5	Charwelton ..	—	78 45	77 45
				p.w.s.
78·5	Braunston ..	—	84 45	84 27
83·2	Rugby ..	—	88 55	89 00
				sigs.
90·0	Lutterworth ..	—	95 50	96 08
93·9	Ashby ..	—	99 05	100 10
98·4	Whetstone ..	—	103 05	103 57
103·1	Leicester ..	109	107 50	108 41
103·1	Net times (min.)	109	106½	106¾

timed by myself and the other by a correspondent, in which the hill-climbing performed was of such merit as to call for but little in the way of exceptionally high downhill speeds. On my run we touched 67 m.p.h. at Neasden, went up the 1 in 100 to Harrow at a minimum of 48, reached 64½ at Pinner, did not go below 55½ at Northwood, and attained 69 before the Rickmansworth slack. Here we were 2¼ min. ahead of time, which was just as well, in view of the remarkably sanguine expectation of the working book that this train will maintain an average speed of 44 m.p.h. up the 1 in 105 to Chalfont, and 61½ an hour up the remainder of the ascent to Amersham and on thence to Missenden! Actually we went up at a steady 39–40 m.p.h.; then we touched 72½ before Missenden, and the modest figure of 70 beyond Wendover, with an intervening minimum of 49½ at Dutchlands. After reducing speed for Quainton Road Junction, we touched 67 m.p.h. at Grendon Junction, after Calvert and after Finmere; and then climbed the long 1 in 176 stretches past Finmere and Brackley at the high minimum rates of 53½ and 54 m.p.h. Despite the speed restriction at Helmdon, for a slip in the bank on the down side, we were early through Woodford, and maxima of 75 an hour at Braunston and Whetstone sufficed to bring us into Leicester 1¼ min. in front of schedule, in a net time of 106½ min. for the journey of 103·1 miles.

My correspondent's journey was very similar, with speeds of 65 m.p.h. at Neasden, 48 at Harrow, 60 at Pinner, 50½ at Northwood and 68 before Rickmansworth; then a maintained 40 up the 1 in 105 to Amersham. After that came 74 m.p.h. near Missenden, 54 at Dutchlands, 72½ (checked by brakes) below Wendover, a slack to 60 at Aylesbury, 65 at Grendon, 59 at and 65 after Calvert, 53½ through Finmere and 66 beyond, 53½ to the top of Brackley bank, just before Helmdon, 71½ at Culworth Junction and 55½ at Charwelton. In descending Catesby bank speed had reached 70½ an hour when there came a slight p.w. check at Staverton Road after which the driver attained 67 at Braunston, fell to 58½ through Rugby, and re-attained 67 at Shawell. Approaching Lutterworth No. 5433 experienced another slight check, but once again a maximum of 75 at Whetstone was suffi-

Digitized by Google

Digitized by Google

cient to ensure correct time-keeping. Net time in this case was about 106¾ min.

In the up direction, over the same route, my two recorded journeys—the first on the 4.48 p.m. from Leicester, and the second on the 9.18 a.m. (allowed 2 min. more than the former from Woodford to Quainton Road, for some obscure reason), were in curious contrast. But both exhibited the habits of the locomotive

L.N.E.R. LEICESTER-MARYLEBONE.

Distance.	Engine No. ..	Schedule.	6167	6364
	Load (axles)		24	20
	,, (tons tare)		209	172
	,, (,, full)		220	180
miles.		min.	m. s.	m. s.
0·0	Leicester	0	0 00	0 00
4·7	Whetstone.. ..	—	—	6 40
9·2	Ashby..	—	12 30	11 35
13·1	Lutterworth ..	—	17 15	15 45
				p.w.s.
19·9	Rugby	—	23 00	22 30
24·6	Braunston.. ..	—	26 50	27 20
31·6	Charwelton ..	—	34 20	34 50
34·0	Woodford	37	36 55	37 15
37·0	Culworth	—	39 35	40 00
40·6	Helmdon	—	42 50	43 30
43·8	Brackley	—	45 40	46 30
48·6	Finmere	—	49 35	50 45
54·3	Calvert	—	54 05	55 35
56·3	Grendon Jc. ..	—	55 45	57 25
			sigs.	
59·0	Quainton Rd. Jc.	59	59 55	60 15
				p.w.s.
65·1	Aylesbury	66	66 35	67 50
67·4	Stoke Mandeville	—	69 00	70 40
69·8	Wendover	—	72 10	73 45
74·3	Gt. Missenden ..	76	77 55	79 00
79·5	Amersham.. ..	—	82 40	84 10
			p.w.s.	p.w.s.
85·9	Rickmansworth	89	89 15	90 50
89·4	Northwood ..	—	93 45	95 25
				p.w.s
91·7	Pinner	—	96 10	99 15
93·9	Harrow	98	98 30	101 55
98·0	Neasden Jc. ..	102	102 55	106 35
103·1	Marylebone ..	110	110 05	113 45
103·1	Net times (min.)	110	107	108

types concerned, the large 4-6-0 engine (No. 6167) going moderately uphill and flying downhill, while the compound "Atlantic" (No. 6364) did excellent work uphill and ran but moderately on the falling grades. No. 6167 ascended the 1 in 176 past Ashby at 46½ m.p.h., but touched 67 at Lutterworth and 82 at the bottom of the dip between there and Rugby. Over Rugby "hump" we went at a minimum of 70½ an hour, after which we reached the most unusual maximum, in this direction of working, of 79 at Braunston. Up Catesby bank we fell to 48½ m.p.h., and then followed some riotous running, with top speeds at 71½ an hour at Culworth Junction, 80½ below Brackley, 79 before Calvert, and 75 before Grendon, where we had bettered "even time" from Leicester, and had averaged 71 m.p.h. over the 22·3 miles from Woodford, and all but 75 an hour over the 12·5 miles from Brackley. At Quainton Road, however, we were nearly stopped by adverse signals, which made us slightly behind time at Aylesbury, even though we re-attained 67 m.p.h. in the short intervening distance. Up the 1 in 117 past Wendover our minimum rate was 37½ m.p.h., after which followed speeds of 75 m.p.h. beyond Missenden, 57 at Amersham summit, 70½ (severely checked by brakes) down to Rickmansworth, the usual slack there, 46 at Northwood, 67 at Pinner, 30 (service slack) at Harrow and 71½ at Neasden. So we arrived on time, having covered the 103·1 miles in a net time of about 107 min.

The compound started well, maintaining 53½ m.p.h. up the 1 in 176 to Ashby—after attaining 57½ at Whetstone—but there was a bad p.w.r. check before Rugby. For all that, with a finely-sustained 54 m.p.h. to the top of Catesby bank, we were practically on time through Woodford. But the downhill going was leisurely, although maxima of 71½ below Brackley and 72½ before Calvert sufficed to gain a minute on the easier allowance of 24 min. between Woodford and Quainton Road. A very severe permanent-way check was experienced shortly before Aylesbury, but we recovered to 45 m.p.h. up the 1 in 117 past Wendover; then, however, we did not get above 70½ m.p.h. beyond Great Missenden, and fell, rather poorly, to 52½ at Amersham. A further severe p. w. check was suffered at Pinner, with the result that our total time was 1¾ min. over the 112 min. allowed; the net time was about 108 or 108½ min. One cannot avoid the conclusion that a little more energetic travelling downhill, to supplement the fine hill-climbing of this journey, would without difficulty have brought us in punctually.

Then there are the two down journeys

Digitized by Google

on the heavy and difficult 6.20 p.m. Bradford express out of Marylebone, which takes the longer Wycombe route. This, I regret to say, is one of my "black list" trains, as I have never yet known it to run with absolute punctuality. On the second of these trips, however, Driver Lancashire got as near to a punctual arrival at Leicester as makes no matter—within less than a minute, in fact—by some running of very great merit, in view

L.N.E.R. 6.20 P.M. MARYLEBONE–LEICESTER.

Distance.	Engine 4-4-2 No. *Loads :—* To Finmere (tons) ,, Woodford ,, ,, Leicester ,,	Schedule.	5266 Empty. 274 237 200	5259 Full. 288 249 210
miles.		min.	m. s.	m. s.
0·0	Marylebone ..	0	0 00	0 00
5·1	Neasden Jc. ..	9	9 40	9 40
11·6	Northolt Jc. ..	17	17 35	18 00
16·1	Denham ..	—	23 05	23 00
18·8	Gerrard's Cross	—	26 35	26 05
			sigs.	
23·0	Beaconsfield ..	—	32 45	31 10
27·9	High Wycombe	35	38 15	36 05
30·1	West Wycombe	—	41 30	39 00
32·8	Saunderton ..	—	45 30	42 30
36·0	Princes Risboro'	45	49 20	46 00
41·4	Haddenham ..	—	54 00	50 35
45·4	Ashendon Jc.	—	57 40	54 05
51·3	Grendon Jc. ..	60	63 40	60 05
53·3	Calvert ..	—	65 45	62 05
59·0	Finmere (slip)	68	72 00	67 50
63·8	Brackley ..	—	77 30	72 55
67·0	Helmdon ..	—	81 25	76 35
			p.w.s.	
70·6	Culworth ..	—	85 35	80 10
73·6	Woodford (slip)	82	88 40	82 55
76·0	Charwelton ..	—	91 10	85 25
83·0	Braunston ..	—	97 10	91 55
87·7	Rugby ..	—	101 15	96 00
94·5	Lutterworth ..	—	107 50	102 45
98·4	Ashby ..	—	111 40	106 35
102·9	Whetstone ..	—	115 10	110 15
107·6	Leicester ..	114	119 35	114 45
107·6	Net times (min.)	114	117¼	114¾

of the age of the engine concerned and the hard character of the schedule. Simple "Atlantic" No. 5266 made a typical trip, shown in the first column. The two slacks, as nearly as I can calculate, did not affect the running to the extent of more than 2¼ min., so that a loss of 3¼ min. must go against the engine, all lost on the London side of Princes Risborough. There is no need to go into detail about the intermediate speeds, except to note the gallant effort that was made from Woodford, with the load reduced to six vehicles; we touched 80½ m.p.h. at both Braunston and Whetstone, fell to 64½ at Rugby, reached 72½ at Shawell, and fell to 57½—a good minimum figure—before Lutterworth.

But the running of three-cylinder compound 4-4-2 No. 5259, *King Edward VII*, was throughout very fine. We climbed the 1 in 87 to Brondesbury at 32 m.p.h. and touched 57½ before Neasden, where we slowed carefully to 40. There was a minimum of 44½ an hour after Sudbury Hill, and a slack to 50 over Northolt Junction. On the Joint line we touched the mile-a-minute rate at Denham, fell to 50 m.p.h. on the 1 in 175, but recovered to 52½ on the 264 and attained 64½ before slowing to 45 through High Wycombe and round the succeeding curves. There was a recovery to 50½ m.p.h. beyond West Wycombe, and our minimum rate past Saunderton was 48½ m.p.h.; then came a top speed of 77½ m.p.h. at Haddenham. After rejoining the main line, and passing Grendon dead to time, we fell to 56½ m.p.h. at Calvert and touched 66 on the ensuing dip; showed a minimum of 52 up the 1 in 176 to Finmere—a notable feat with 290 tons—and touched 66 before Brackley; maintained 52½ up to Helmdon and reached 68 at Culworth Junction; and the concluding speeds were 77½ at Braunston, 58½ at Rugby, 68 at Shawell, 54 before and 65 at Lutterworth, and 77½ at Whetstone. I rather fancy that the 69-min. booking allotted to this train over the 71·6 miles from Princes Risborough to Leicester is the fastest, for its length, operating over any part of the L.N.E.R. system; certainly there is not a minute to spare anywhere.

Singularly enough, at Leicester we exchanged No. 5259 for another compound—No. 5364, *Lady Henderson*—which with 245 tons made a brilliant run to Nottingham (23·4 miles) in exactly the 25 min. allowed, touching 80½ an hour at Loughborough and 79 at Ruddington, and maintaining a minimum of 64 an hour over Barnston summit. We passed Loughborough, 9·8 miles, in 12¼ min., and Arkwright Street, 22·5 miles, in 23 min. 10 sec. This is but one of many lively

Digitized by Google

"snippets" that I have timed between these two Midland cities. For example, No. 5192, simple, "Atlantic," continuing the previous trip with 245 tons, passed Loughborough in 11½ min., and Ruddington, 19 miles, in 19 min. 10 sec., but approached Victoria so slowly as to take in all 25 min. 35 sec.; on this occasion the two maxima were again 80½ and 79 m.p.h., and the intervening minimum was as high as 66 an hour. No. 4428—a Great Northern "Atlantic"—also covered the distance with 210 tons in 25 min. 15 sec., despite a p.w.r. check near the end of the run, passing Loughborough in 11 min. 35 sec., at 80½ m.p.h., falling to 66 at Barnston, and reaching 80½ again at Ruddington. Such running as this is certainly stimulating, by comparison with the depressing sloth of some of the long-distance main-line travelling of the present day.

Before I conclude this article I have a conundrum to propound to readers. It is this. What two express trains, owned and worked by the same railway company, pass non-stop through a certain junction between 100 and 150 miles from London, *in opposite directions of running*, within ten minutes of each other, and yet *both* proceed to the same terminus in London, the first to pass the said junction arriving five minutes after the second? Each of the two trains concerned makes one stop after passing the junction, but does not reverse its direction of working. I do not propose to offer any prize for a solution, but I fancy the problem may provoke some anxious thought!

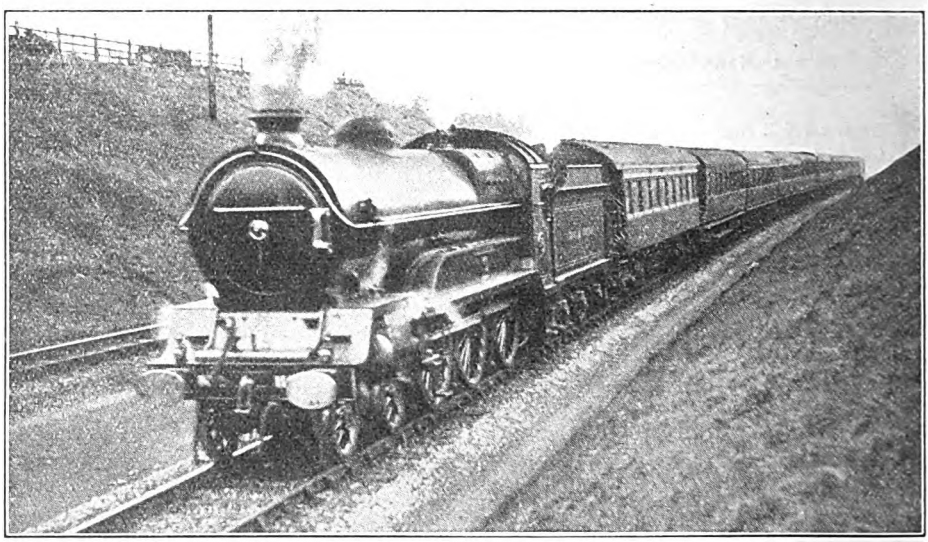


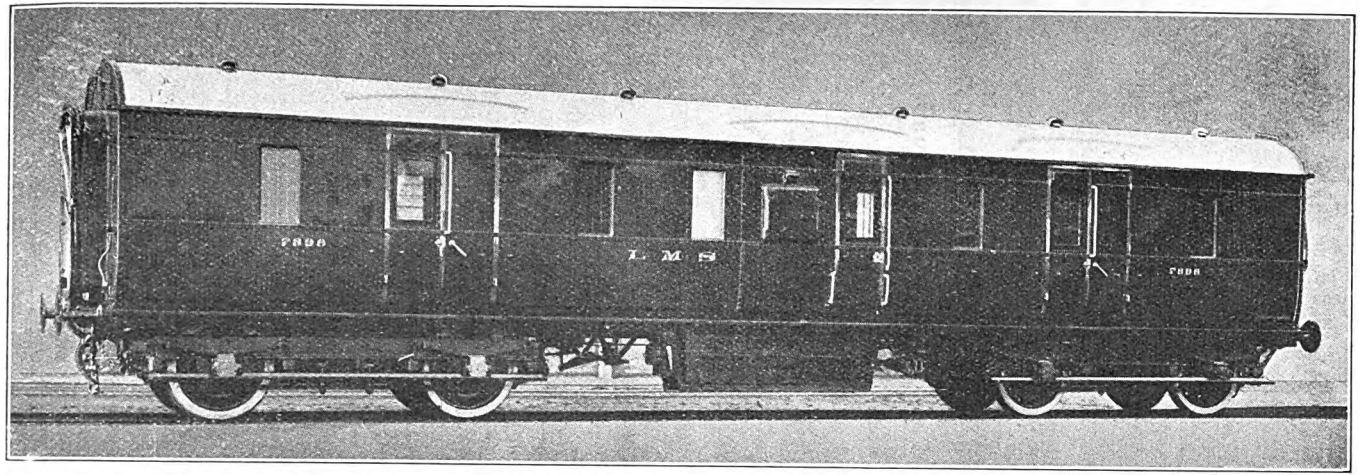
Photo.] [*Henry L. Salmon.*

MANCHESTER-LONDON EXPRESS, L.N.E.R. (G.C. SECTION).
Four cylinder 4-6-0 No. 1169 "Lord Faringdon."

Letters have been received this month from Rev. W. H. Dew, W. C. Rowcliffe, E. W. Maybank, O. S. Nock, H. J. J. Griffith, T. Adkins, R. J. Dallas, R. K. Johns, T. E. Norman, C. G. Woodnutt, A. D. Pordije, J. D. Thomson, A. Craven, N. Clements, K. L. F. Robinson, A. C. Johnson, and H. M. A number of these letters contained data of Great Central running in some cases of a very notable character and including two timekeeping runs on the 6.20 p.m. down express, but too late, unfortunately, for inclusion in this article.

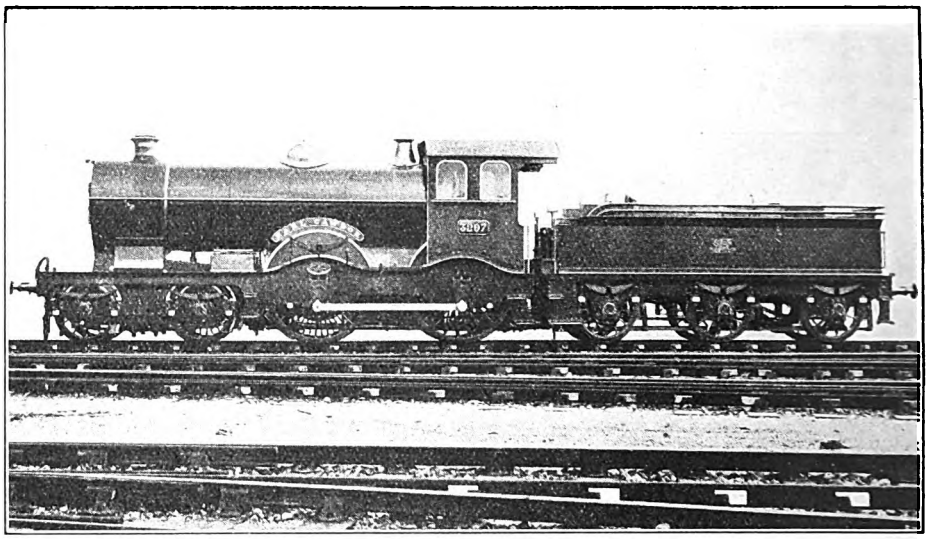
Digitized by Google

ENAMELLED STEEL BRAKE VANS, L.M.S.R.



A PASSENGER brake van, constructed by the Birmingham Railway Carriage & Wagon Co. Ltd., for the L.M.S.R., is illustrated, above the special feature being that it has a "Vitreous" enamelled steel body, the enamelling process having been carried out by Mead, McLean & Co. Ltd. The experiment has been undertaken at the instigation of Mr. R. W. Reid, C.B.E., Vice-President, L.M.S.R., who conceived the idea in order to eliminate much of the time usually expended on the painting of carriages, which is approximately 20 days. Arrangements were made with the builders to experiment, in conjunction with Mead, McLean & Co. Ltd., on one of a batch of 50 vehicles which the former were building for the L.M.S.R. Many difficulties were met with in the early stages of the experiment, but these have been satisfactorily overcome and the first vehicle has now been placed in traffic. The enamelling of the exterior has been carried out in the usual standard colours, including lettering and numbering. The fine lining has, however, been omitted, and no paint has been used above the underframe except round the door margins and gangways. The exterior panelling, mouldings, &c., for sides, ends and roof have been enamelled by the vitreous process. The behaviour of the viteous panels will be watched with considerable interest, as it is claimed that the colours will be permanent and that there will be no necessity for repainting and revarnishing.

Digitized by Google



4-4-0 NO. 3297 "EARL CAWDOR," AS FIRST REBUILT.

Modern Locomotive Practice on the Great Western Railway. [No. IV.]

By F. W. BREWER, A.I.Loco.E.

As regards the capabilities of the "Badmintons," I may mention a run made early in 1898 by No. 3297 *Earl Cawdor*, on the 4.45 p.m. *ex* Paddington to Birmingham. With this train, which consisted of ten 8-wheelers, the engine maintained an average speed of 55·9 m.p.h. between London and Oxford, and of 57·2 m.p.h. between Oxford and Birmingham. This was by no means poor work. Mr. Chas. Rous-Marten timed the first of the class, No. 3292 *Badminton*, when practically new, on the 10.45 a.m. South Wales express to the first stop at Bath, when the distance of virtually 107 miles from Paddington was covered in 1 hr. 58 min. 19 sec., or in 3 min. 41 sec. under time. The load behind the tender was 178 tons. Nothing much in the way of fast running was done until West Drayton was passed, the 13¼ miles to that point having occupied 17 min. 15 sec. But the 5¼ miles from West Drayton to Slough took only 4 min. 55 sec., and the 4 miles, Slough to Taplow, 3 min. 50 sec. Reading, 36 miles from the start, was passed in 39 min. 57 sec., and Swindon, 77¼ miles, in 85 min. 56 sec. Down the Wootton Bassett bank at 1 in 100, a maximum speed of 72·6 m.p.h. was reached, and the same rate was attained on the similar down grade through the Box tunnel.

On the return journey, with the corresponding up train, the engine was No. 3293 *Barrington*, and the load 204 tons. The Box tunnel and Wootten Bassett banks had now to be ascended, and up these the speed did not fall below 45. Swindon, 29½ miles from Bath, was passed in 36 min. 7 sec., and Didcot, 53¾ miles, in 61 min. 47 sec. The 24½ miles from Swindon to Didcot were run in 23 min. 40 sec., and the 53 miles from the latter station to Paddington in 57 min. 23 sec., the engine having been eased after passing Didcot. The total journey time was 1 hr. 59 min. 20 sec. The train had left Bath 13 min. late, but the arrival time at Paddington was nearly 3 min. early, so that the engine had made up practically 16 min. on the run of 107 miles. It will be noticed that

Digitized by Google

each journey occupied practically the same total time, the up run taking 61 sec. longer than the down one.

A good performance was recorded later with No. 3298 *Grosvenor*. In this case, the run was from Bristol to Exeter (75½ miles), and it involved, therefore, the 4 miles' climb at 1 in 81 to 1 in 93 from Wellington to Whiteball summit. The load was about 220 tons. Starting from Bristol 2½ min. late, this time was made up in the first 30 miles, and the Whiteball summit was reached 1½ min. early. The 11 miles of uphill from Taunton to that point took 14 min. 47 sec., and the speed kept well over 30 m.p.h. up the incline at 1 in 81. A fast descent followed on the downhill stretch from Whiteball to Exeter, and the total distance of 75½ miles from Bristol was completed in 80 min. 4 sec. Taunton, 44¾ miles from Bristol, was passed in 47 min. 44 sec. The 39 miles 10 chains from Bourton to Taunton were covered in 37 min. 45 sec.; the 20 miles from Whiteball to the stop at Exeter, in 18 min. 3 sec.; and the 13 miles 48 chains from Tiverton Junction to Cowley Bridge in 11 min. 21 sec.

An excellent feature of this class was undoubtedly their then comparatively high steam pressure of 180 lb. This pressure had, however, been temporarily used in the 0-4-2 tank engines of 1887–89, and it was also employed in the two broad-gauge 7-ft. wheel 2-4-0's, Nos. 14 and 16 of 1888. But we see in the "Badmintons" the real beginning of the Company's subsequent general practice in this connection, and when these 4-4-0's were in due course rebuilt, they were given a still higher pressure.

Waterford attracted a good deal of attention when it first came out, but it was doomed to be surpassed in 1903 by another member of the "Badminton" series, No. 3297 *Earl Cawdor*, which in that year was reconstructed in an entirely different form, with a round-topped firebox, a domed boiler, and a cab of the N.E.R. style, having two windows on either side. The new boiler was a comparatively large one; its length was 11 ft. 6 in. (an increase of 6 in.), and its maximum outside diameter was 5 ft. 5 in. Its centre line was 8 ft. 8 in. above the rails. This boiler was provided with a very small dome, said to be impossible in the case of *Waterford*, although the latter had a boiler 4 ft. 5 in. in diameter. The heating surface of the firebox of No. 3297, as rebuilt, was 130·75 sq. ft., but the grate area was only 17·85 sq. ft. Including 1,863·27 sq. ft. in the tubes, the total heating surface amounted to 1,934·02 sq. ft. This was a remarkably liberal figure for a 4-4-0 engine in 1903. Another outstanding feature was an increase in steam pressure to 210 lb., and at that time no other British simple 4-4-0 had so high a pressure, but it may be mentioned in passing that the third batch of the Caledonian "Dunalastairs," built in 1899, had 200 lb. The cylinder and wheel dimensions of *Earl Cawdor* remained as before, but the weight of the engine was augmented to 56 tons 14 cwt.; weight of tender, 36¾ tons; total, 93 tons 9 cwt. This engine was transferred to the "Flower" class in 1911, the "Waterford" having been similarly included in 1907.

Commencing in 1903, the "Badmintons" were gradually furnished with domeless tapered boiler barrels. At first, some of these boilers were of the size used in the "City" class of 4-4-0's, introduced in 1903, and were 11 ft. long, with outside diameters of 4 ft. 10¾ in. and 5 ft. 6 in. They had a pressure of 200 lb., a total heating surface of 1,818·12 sq. ft., and a grate area of 20·56 sq. ft. The weight of the engines having these boilers was 56 tons. One engine, No. 3305 *Samson*, was fitted with a 14-element Swindon superheater (84 steam tubes) in 1909, altering the total heating surface to 1,548·22 sq. ft. Later, a smaller taper boiler was adopted for the engines, the diameters being 4 ft. 5⅛ in. and 5 ft. 0½ in., and the working pressure 195 lb. The superheaters with these boilers varied, some having 6 elements and 48 steam tubes, and others 12 elements and 72 steam tubes. With the former, the total heating surface was 1,373·74 sq. ft., and in the latter case, 1,214·19 sq. ft. As before, the weight of the rebuilt engines was 56 tons. At the period in question, the "Badmintons" carried their old numbers. The latest practice in regard to this class includes the fitting of the engines with the smaller boilers referred to, but having a working pressure of 200 lb. instead of 195 lb., and equipped with 6-element 36 steam-tube superheaters. At 85 per cent. of the

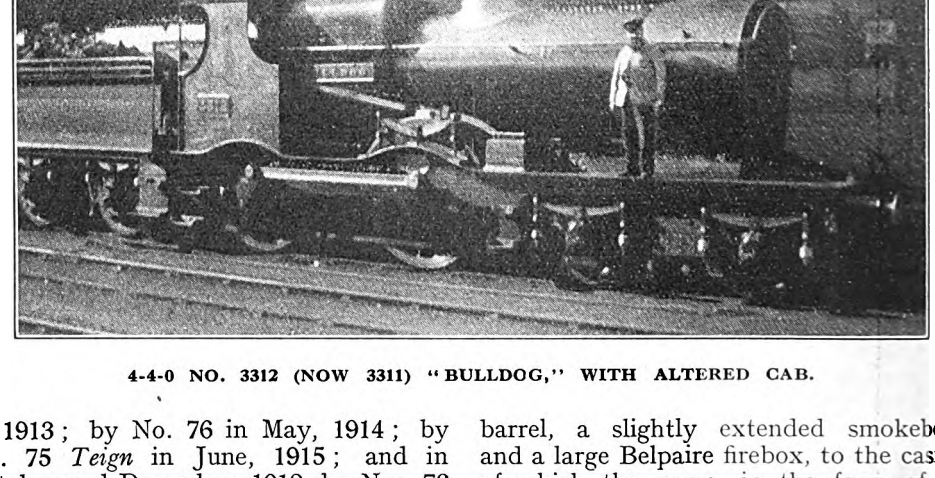
Digitized by Google

higher pressure, the tractive force is 17,790 lb.

Mention has been made of the "River" class. The last in service of these 2-4-0 engines were Nos. 73 *Isis* and 74 *Stour*, which were broken up in the latter part of 1918. Three had been provided with Belpaire fireboxes, viz., No. 72 *Exe*, in 1911; and Nos. 74 *Stour* and 76 *Wye*, in 1912. I am not sure if the latter then bore a name. Of the others, No. 70 *Dart*, was badly damaged in a collision which occurred at Thingley Junction on January 16, 1907, and was then scrapped. It was followed, in March of the same year, by No. 69 *Avon*; by Nos. 71 *Dee* and 72 *Exe* in 1913; by No. 76 in May, 1914; by No. 75 *Teign* in June, 1915; and in October and December, 1918, by Nos. 73 and 74, respectively. The "River" class were handsome little engines, and performed very good work. They had 17-in. by 24-in. cylinders, and outside frames of the broad-gauge slotted type. As previously remarked, they had the "Stroudley" crank arrangement.

Dealing next with the "Bulldog" class of 4-4-0's, the earlier examples of these had domed boilers, and, with the exception of the engine from which the class title was derived, were generally similar to the "Dukes." In fact, as already mentioned, eleven of the engines were "exchanged" for the same number of 4-4-0's originally classed as "Dukes." Like the latter, all of the "Bulldogs" have 18 in. by 26 in. cylinders, 5 ft. 8 in. coupled wheels, and double frames. The later engines differed as regards the boilers and framing, as will be pointed out in due course.

The class-name engine was No. 3312 (now 3311) *Bulldog*. This was turned out in 1898, and although it had outside frames similar to those of the "Dukes," and a domed boiler, no other engine was built precisely like it. As compared with the other 5 ft. 8 in. 4-4-0's, it had a somewhat bigger and higher-pitched boiler barrel, a slightly extended smokebox, and a large Belpaire firebox, to the casing of which the name, in the form of an oblong plate, was fixed on either side. The cab of the *Bulldog* had a door in front, on the fireman's side of the engine, and was fitted with vertical handrails reaching to the roof. This cab, by the way, was wider than usual, and covered the rear portions of the splashers and springs of the trailing coupled wheels.



4-4-0 NO. 3312 (NOW 3311) "BULLDOG," WITH ALTERED CAB.

The boiler, which stood with its centre line 7 ft. 9 in. above the rails, was 11 ft. in length, and had a maximum diameter outside of 4 ft. 7 in., while the firebox casing was 7 ft. long with a width of 5 ft. 3 in. at the front, decreasing to 4 ft.

Digitized by Google

at the back. This last-mentioned feature, the plan of widening out the firebox at the forward end, became a favourite one on the Great Western Railway. The total heating surface of No. 3312 amounted to 1,712·30 sq. ft., to which the firebox, which had a grate area of 23·50 sq. ft., contributed 122·80 sq. ft., and the tubes (286 of $1\frac{7}{8}$ in. diameter) 1,589·50 sq. ft. The steam pressure was 180 lb., and the tractive force 18,955 lb. This engine weighed 49 tons 4 cwt.; it had a 2,000-gallon tender weighing $34\frac{1}{4}$ tons, making a combined total of 83 tons 9 cwt. The four-coupled wheels carried a joint load of 31 tons 18 cwt. Steam reversing gear was at first fitted to the engine; this gear, however, was afterwards replaced by the ordinary hand-screw arrangement (the cab on the right-hand side was extended in a curve to cover it), and another alteration consisted in the provision of volute springs. The *Bulldog*, the present number of which is 3311, was rebuilt with a domeless boiler in 1906.

In 1899 there appeared a new variant of the "Bulldog" class. It bore the name *Camel*, and was then numbered 3352 (now 3340). It had a domeless parallel Belpaire boiler, and an extended cylindrical smokebox resting on a saddle, as in American practice. It was probably the first British-built locomotive to embody these two last-noted features, the employment of which is now more or less general in this country. But it may be stated, in passing, that in 1899 four of our railway companies (three English and one Welsh), viz., the Midland, Great Northern, Great Central, and Barry, had each ordered a number of engines from locomotive building firms in the United States, and these engines, some of which were delivered about the middle of 1899, all had, of course, outside cylinders and the typical American circular smokebox, with saddle formed by those cylinders. Ten only of the Yankees had extended smokeboxes. A further interesting point is that these ten engines had coned, or wagon-top, boilers, a type that was afterwards taken up on the G.W.R. by Mr. G. J. Churchward, in 1902. With the exception of those for the Barry Railway, all the American engines were 2-6-0's, of which type there were eighty.

I am far from asserting, however, that there was any connection between these matters and the engines imported from the United States. For it is important to remember that, as regards the cylindrical smokebox, at any rate, this was employed by Mr. Dean, in the first instance, in the case of inside cylinder locomotives, and this fact constitutes an essential difference from ordinary American practice. Subsequently, both the cylindrical smokebox and the coned boiler, acknowledged to be American features, were, as we know, applied to outside cylinder engines on the Great Western Railway.

To revert to the *Camel*. The domeless non-taper boiler with which the engine was at first fitted was 4 ft. $6\frac{1}{4}$ in. in diam. outside the larger ring, and 11 ft. in length. The working pressure was 180 lb., the grate area 21·45 sq. ft., and the total heating surface 1,663·02 sq. ft. The safety-valves were fitted over the boiler barrel, and the outside frames were curved to clear the coupling-rod heads. The weight of the engine was 49 tons 16 cwt., and that of the tender, as then provided, was 33 tons. The other engines having curved framing and similar non-domed parallel boilers, also built in 1899, were Nos. 3332-3351 (now 3320-3339). In 1900, commencing with the first of a new series, No. 3353 (renumbered 3341) *Blasins*, the framing above the coupling rods was cut in a straight line, and this plan was adopted for all of the succeeding "Bulldogs." The engines built in 1900 were Nos. 3353-3372 (now 3341-3360); they were followed by Nos. 3413 and 3414 in 1902, and by Nos. 3415-3432 in 1903. The new numbers of the latter engines, including the two turned out in 1902, run from 3361 to 3380. All of the engines now numbered 3341-3380 had, therefore, when new, straight-topped frames and non-tapered Belpaire boilers. The weight of Nos. 3300-3340 is now 50 tons, and that of Nos. 3341 onwards 51 tons 16 cwt.

The remaining engines of the "Bulldog" class were constructed with taper boilers. These engines were Nos. 3443-3452 (3381-3390), built in 1903; Nos. 3453-3472 (3391-3410), built in 1904; and Nos. 3701-3730 (3411-3440), turned out in 1906, the present running numbers being those in brackets. After the latter, in 1909-10, came 15 further engines known as the "Bird" series, of which 10, Nos. 3731-

Digitized by Google

Digitized by Google

and the steam pressure was increased to 200 lb. With this pressure the tractive force is 21,060 lb., as against 20,535 lb. with a pressure of 195 lb., and 18,955 lb. with 180 lb., the figure employed in the earliest engines. The total heating surface with the double-row superheaters was 1,214·19 sq. ft., and that for the single-row apparatus, 1,357·85 sq. ft.

The following summary gives the present numbers, principal features, and dates of construction of the various series comprising the "Bulldog" class :—

Present Nos.	Features when New.	Year Built.
*3300–	Domed boiler. Curved frame.	1895
*3301–3306	,, ,,	1896
*3307–3310	,, ,,	1897
3311–	,, ,,	1898
3312–3319	,, ,,	1899
3320–3340	Domeless boiler. Curved frame	1899
3341–3360	Domeless boiler. Straight frame	1900
3361–3362	,, ,,	1902
3363–3380	,, ,,	1903
3381–3390	Taper boiler. Straight frame	1903
3391–3410	,, ,,	1904
3411–3440	,, ,,	1906
†3441–3450	,, ,,	1909
†3451–3455	,, ,,	1910

I also append a list of the "Bulldog" class, setting forth the old and new numbers of the engines, together with their names and dates when built.

Present No.	*Name.*
3361	*Edward VII.*
3382	*Cardiff.*
3384	*Swindon.*
3385	*Newport.*
3386	*Paddington.*
3387	*Reading.*
3388	*Swansea.*
3389	*Taunton.*
3390	*Wolverhampton.*

Several of the engines have been running without names, and since the list was originally compiled, the undermentioned engines have had their nameplates removed. The name of the first engine is now borne by one of the "Kings," while in the case of the others, the names were taken off in order that they should not be regarded as indicating the destination of the engines when working passenger trains.

Another engine, No. 3353, formerly *Plymouth*, has been renamed *Pershore Plum*. The above changes were made in 1927.

The *Camel* carried the number on the smokebox, and the name in a large oval plate on the cab. Later, both number and name were included on the cab plate, and, later still, the name itself was borne separately on a curved plate fixed above the driving splasher, a plan since followed on the L. & N.E. and L.M. & S. Railways, for the "Pacifics" and "Shires," and the *Royal Scot*, respectively. One of the "Bulldogs," No. 3334 (formerly 3346) *Tavy*, was in 1904 experimentally provided with a mechanical stoker. This was, I understand, afterwards removed and fitted to No. 4338 (now 4127) *Ladysmith*, one of the "Flower" class. In the 1904 period, the newer "Bulldogs" were working from Swindon to Paddington with fast passenger trains weighing over 300 tons behind the tender.

"BULLDOG" Class.

4-4-0 Type.

Inside Cylinders, 18 in. by 26 in.

Coupled wheels, 5 ft. 8 in.

Old No.	New No.	Name.	Year Built.
3253	3300	—	1895
3262	3301	—	1896
3263	3302	*Sir Lancelot*	,,
3264	3303	*St. Anthony*	,,
3268	3304	*River Tamar*	,,
3269	3305	*Tintagel*	,,
3273	3306	*Armorel*	,,
3279	3307	*Exmoor*	1897
3280	3308	*Falmouth*	,,
3282	3309	*Maristow*	,,
3286	3310	*St. Just*	,,
3312	3311	*Bulldog*	1898
3316	3312	*Isle of Guernsey* (*a*) ..	,,
3318	3313	*Jupiter*	,,
3322	3314	*Mersey*	,,
3324	3315	*Quantock*	,,
3325	3316	*St. Colomb*	,,
3327	3317	*Somerset*	,,
3330	3318	*Vulcan*	,,
3331	3319	*Weymouth*	,,
3332	3320	*Avalon*	1899
3333	3321	*Brasenose*	,,
3334	3322	*Eclipse*	,,
3335	3323	*Etona*	,,

(*a*) Formerly *Guernsey*.

* Formerly "Duke" class.
† "Bird" class. Deep frames.

Digitized by Google

Old No.	New No.	Name.	Year Built.
3336	3324	*Glastonbury*	1900
3337	3325	*Kenilworth*	,,
3338	3326	*Laira*	,,
3339	3327	*Marco Polo*	,,
3340	3328	*Marazion*	,,
3341	3329	*Mars*	,,
3342	3330	*Orion*	,,
3343	3331	*Pegasus*	,,
3344	3332	*Pluto*	,,
3345	3333	*Perseus*	,,
3346	3334	*Tavy*	,,
3347	3335	*Tregothnan*	,,
3348	3336	*Titan*	,,
3349	3337	*The Wolf*	,,
3350	3338	*Swift*	,,
3351	3339	*Sedgmoor*	,,
3352	3340	*Camel*	1899
3353	3341	*Blasius*	1900
3354	3342	*Bonaventura*	,,
3355	3343	*Camelot*	,,
3356	3344	*Dartmouth*	,,
3357	3345	*Smeaton* (*b*)	,,
3358	3346	*Godolphin*	,,
3359	3347	*Kingsbridge*	,,
3360	3348	*Launceston*	,,
3361	3349	*Lyonesse*	,,
3362	3350	*Newlyn*	,,
3363	3351	*One and All*	,,
3364	3352	*Pendragon*	,,
3365	3353	*Plymouth*†	,,
3366	3354	*Restormel*	,,
3367	3355	*St. Aubyn*	,,
3368	3356	*Sir Stafford*	,,
3369	3357	*Trelawney*	,,
3370	3358	*Tremayne*	,,
3371	3359	*Tregeagle*	,,
3372	3360	*Torquay*	,,
3413	3361	*Edward VII**	1902
3414	3362	*Albert Brassey*	,,
3415	3363	*Alfred Baldwin*	1903
3416	3364	*Frank Bibby*	,,
3417	3365	*Charles Grey Mott* (*c*)	,,
3418	3366	*Earl of Cork*	,,
3419	3367	*Evan Llewellyn*	,,
3420	3368	*Sir Ernest Palmer*	,,
3421	3369	*David MacIver*	,,
3422	3370	*Sir John Llewellyn*	,,
3423	3371	*Sir Massey Lopes*	,,
3424	3372	*Sir N. Kingscote*	,,
3425	3373	*Sir William Henry*	,,
3426	3374	*Walter Long*	,,
3427	3375	*Sir Watkin Wynn*	,,
3428	3376	*River Plym*	,,
3429	3377	*Penzance*	,,
3430	3378	*River Tawe*	,,
3431	3379	*River Fal*	,,
3432	3380	*River Yealm*	,,
3443	3381	*Birkenhead*	,,
3444	3382	*Cardiff**	,,
3445	3383	*Ilfracombe*	,,

(*b*) Formerly *Exeter*.
(*c*) Formerly *C. J. Mott*.
* Name-plates removed, 1927.
† Renamed *Pershore Plum*, 1927.

Old No.	New No.	Name.	Year Built.
3446	3384	*Swindon* (*d*)*	1904
3447	3385	*Newport**	,,
3448	3386	*Paddington**	,,
3449	3387	*Reading**	,,
3450	3388	*Swansea**	,,
3451	3389	*Taunton**	,,
3452	3390	*Wolverhampton**	,,
3453	3391	*Dominion of Canada**	,,
3454	3392	*New Zealand*	,,
3455	3393	*Australia*	,,
3456	3394	*Albany*	,,
3457	3395	*Tasmania*	,,
3458	3396	*Natal Colony*	,,
3459	3397	*Toronto*	,,
3460	3398	*Montreal*	,,
3461	3399	*Ottawa*	,,
3462	3400	*Winnipeg*	,,
3463	3401	*Vancouver*	,,
3464	3402	*Jamaica*	,,
3465	3403	*Trinidad*	,,
3466	3404	*Barbados*	,,
3467	3405	*Empire of India*	,,
3468	3406	*Calcutta*	,,
3469	3407	*Madras*	,,
3470	3408	*Bombay*	,,
3471	3409	*Queensland*	,,
3472	3410	*Columbia*	,,
3701	3411	*Stanley Baldwin*	1906
3702	3412	*John G. Griffiths*	,,
3703	3413	*James Mason*	,,
3704	3414	*A. H. Mills*	,,
3705	3415	*George A. Wallis*	,,
3706	3416	*John W. Wilson*	,,
3707	3417	*Lord Mildmay of Flete*	,,
3708	3418	*Sir Arthur Yorke*	,,
3709	3419	—	,,
3710	3420	—	,,
3711	3421	—	,,
3712	3422	*Aberystwyth*	,,
3713	3423	—	,,
3714	3424	—	,,
3715	3425	—	,,
3716	3426	—	,,
3717	3427	—	,,
3718	3428	—	,,
3719	3429	—	,,
3720	3430	*Inchcape*	,,
3721	3431	—	,,
3722	3432	—	,,
3723	3433	—	,,
3724	3434	*Joseph Shaw*	,,
3725	3435	—	,,
3726	3436	—	,,
3727	3437	—	,,
3728	3438	—	,,
3729	3439	*Weston-super-Mare*	,,
3730	3440	—	,,

(*d*) Formerly *Liverpool*.
* Name-plates removed, 1927.

NOTE.—Where no names are shown the engines have been running without names. New Nos. 3300-3310 were formerly "Duke" class.

Digitized by Google

"BULLDOG" CLASS.
"BIRD" SERIES.

Old No.	New No.	Name.	Year Built.
3731	3441	*Blackbird*	1909
3732	3442	*Bullfinch*	,,
3733	3443	*Chaffinch*	,,
3734	3444	*Cormorant*	,,
3735	3445	*Flamingo*	,,
3736	3446	*Golfdinch*	,,
3737	3447	*Jackdaw*	,,
3738	3448	*Kingfisher*	,,
3739	3449	*Nightingale*	,,
3740	3450	*Peacock*	,,
3741	3451	*Pelican*	1910
3742	3452	*Penguin*	,,
3743	3453	*Seagull*	,,
3744	3454	*Skylark*	,,
3745	3455	*Starling*	,,

ADDENDUM.

Five well-known readers, Mr. E. Little, Mr. J. N. Maskeleyne, Mr. L. B. Hewitt, Mr. C. W. Herbert, and Mr. A. Davidson, have sent appreciative letters concerning the first instalment of this article. These letters, which show that considerable interest is being taken in the article, draw attention to certain matters, as follows :—

With reference to the 7-ft. singles, Mr. Little and Mr. Hewitt deal with the omission on my part to give the names of such of these engines as had them, and the former adds that Nos. 9 and 1123 should be included among the 7-ft. singles which were rebuilt with domeless Belpaire boilers and extended smokeboxes. (It will be remembered that Swindon had not complete records of these rebuilds.) Further, that Nos. 165 and 1128 were equipped with cab-signalling apparatus, and were employed on the Oxford-Fairford Branch.

As regards the 7-ft. 8-in. class, Mr. Maskeleyne points out that the number of re-named engines is incomplete, and Mr. Little, Mr. Hewitt, and Mr. Herbert also refer to the same matter, but these three fail to cite all of the changes of name. Mr. Hewitt, moreover, says that the name-plates on Nos. 3017 and 3049 were at some time transposed, while Mr. Little remarks that No. 3061 was deprived of its name in 1910, and that No. 3074 was similarly treated in 1914. The last-mentioned writer also informs me that Nos. 3018 and 3050 were both rebuilt a second time, on this occasion each with a domed Belpaire boiler like that fitted to No. 3027 in 1911. Three other 4-2-2's, Nos. 3015, 3049, and 3050, were, he says, reconstructed with non-domed boilers, which were slightly smaller than those of the other rebuilds. The original form of smokebox was retained, together with the copper-topped chimneys. Mr. Davidson also writes respecting this particular style of rebuilding, and Mr. Maskeleyne reminds me that No. 3050 had a pair of spiral springs fitted to each axle-box of the bogie, instead of laminated springs.

While thanking these readers for their letters, it is necessary to make clear the fact that space limitations prohibit the writing of a closely-detailed history of every type of Great Western engine, or class of engines, most of which have undergone some alteration, in one way or another, during their respective careers.

However, let me explain. In the first place, the names of the 7-ft. singles were omitted for the reason that they were given by the late Mr. Ahrons in his articles of 1916. Therefore, I did not consider that it would be necessary to repeat them; but in view of the interest evidently taken in these engines, and of the fact that twelve years have elapsed since the appearance of Mr. Ahrons' G.W.R. articles, I have pleasure in now supplying a list of the engines in question. (See next page.)

Secondly, with respect to the 7-ft. 8-in. singles with altered names, I accepted a list sent me by Swindon. A revised list is on page 396.

Thirdly, the fitting of No. 3050 with spiral springs to the bogie was well known to me, and it ought, perhaps, to have been recorded by me.

Fourthly, as to 4-2-2's Nos. 3018 and 3050 having been twice rebuilt, I had to be guided by official information, and these two engines are not among those notified me as having undergone a second reconstruction.

Fifthly, two of the 2-4-0's, Nos. 3215 and 3220, stated by me to have been running in 1927, were, Mr. Herbert tells me, broken up in the same year. That is quite possible, of course, but the engines had not been withdrawn when the article dealing with them was compiled. Where an article, as in this case, has to be prepared some time ahead, it is not always feasible to keep pace with after events.

Digitized by Google

G.W.R. ENGINES. LIST OF 7-FT. SINGLES WHICH BORE NAMES.

No.	Name.	Date Built as 7 ft.	Size of Cylinders.
			in. in.
9*	*Victoria*	1890	18×26
10*	*Royal Albert*	1890	18×26
55	*Queen*	1873	18×24
162	*Cobham*	1879	18×24
378	*Sir Daniel*	1866	17×24
380‡	*North Star*	1866	17×24
381‡	*Morning Star* ..	1866	17×24
471‡	*Sir Watkin*	1869	17×24
999	*Sir Alexander* ..	1875	18×24
1118	*Prince Christian* ..	1875	18×24
1119	*Princess of Wales* (*a*)†	1875	18×24
1122	*Beaconsfield*	1875	18×24
1123	*Salisbury*	1875	18×24
1128	*Duke of York* (*b*) ..	1875	18×24
1129	*Princess May* (*b*) ..	1875	18×24
1130	*Gooch*†	1875	18×24
1132	*Prince of Wales* (*a*)†	1875	18×24

* Built as 7-ft. 8-in. tender engines :—No. 9 in 1884 and No. 10 in 1886. No. 9 was originally constructed as a 4-2-4 tank engine with 7-ft. 8-in. driving wheels, in 1881.

(*a*) Nos. 1119 and 1132 were named as above in 1896, and

(*b*) Nos. 1128 and 1129 in 1893. Of the latter two, the name of No. 1128 was removed in 1897 and that of No. 1129 in 1899.

(†) Eventually, the name-plates on these were also taken off.

‡ Converted to 0–6–0's about 1900–02.

Some other items not mentioned are as follows: one or two of the 7-ft. singles had extended smokeboxes and ordinary domed, flush-topped boilers. A number of the 4-2-2's also had slightly extended smokeboxes, while having the "Dean" domed boiler with raised firebox; No. 3006 had, I believe, a cast-iron chimney in 1900; No. 3067 had "Serve" tubes; Nos. 3061, 3062 and others were turned out with no brass beading round the splashers; lastly, No. 3021 was in 1910, I understand, fitted with wooden templates, in order to ascertain if it were possible to employ outside cylinders on the 7-ft. 8-in. singles, with a view to providing the engines with larger boilers. So it was stated, anyway.

As previously pointed out, I am acting chiefly on official information, but, at the same time, I do not want readers to be deterred from writing at all. With this explanation, I have no doubt that they

LIST OF RENAMED 7-FT. 8-IN. SINGLES.

No.	Old Name.	New Name.
3018	*Racer*	*Glenside.*
3022	*Rougemont* ..	*Bessemer.*
3025	*St. George* ..	*Quicksilver.*
3027	*Thames*	*Worcester.*
3035	*Bellerophon* ..	*Beaumont.*
3041	*Emylor* (*a*) ..	*The Queen.* (*b*)
3055	*Trafalgar* ..	*Lambert.*
3056	*Timour*	*Wilkinson.*
3057	*Tartar*	*Walter Robinson.*
3059	*Voltigeur* ..	*John W. Wilson.*
3060	*Warlock*	*John G. Griffiths.*
3072	*North Star* ..	*Bulkeley.*
3078	*Shooting Star* ..	*Eupatoria.*

(*a*) The name *Emlyn* was afterwards carried by No. 3071.

(*b*) Name subsequently changed from *The Queen* to *James Mason.*

G.W.R. ENGINES CUT UP IN 1927.

No.	Name (if any).	Type.	Diameter of Driving Wheels.	Class.
3215	.. ..	2–4–0	6 ft. 2 in.	3206—3225
3220	.. ..	,,	,,	,,
3241	.. ..	,,	6 ft. 8½ in.	3232—3251
3513	.. ..	,,	5 ft. 2 in.	3501—3520
3523	.. ..	4–4–0	,,	3521—3560
3524	.. ..	,,	,,	,,
3526	.. ..	,,	,,	,,
4105	*Earl Cawdor*	,,	6 ft. 8½ in.	"Badminton."
4114	*Shelburne*	,,	,,	,,
4116	*Savernake*	,,	,,	,,
4117	*Shakespeare*	,,	,,	,,
4118	*Waterford*	,,	,,	,,
4119	*Wynnstay*	,,	,,	,,

Digitized by Google

will readily acknowledge the difficulty of quoting every known item the relative importance of which appears to be largely a matter of individual opinion.

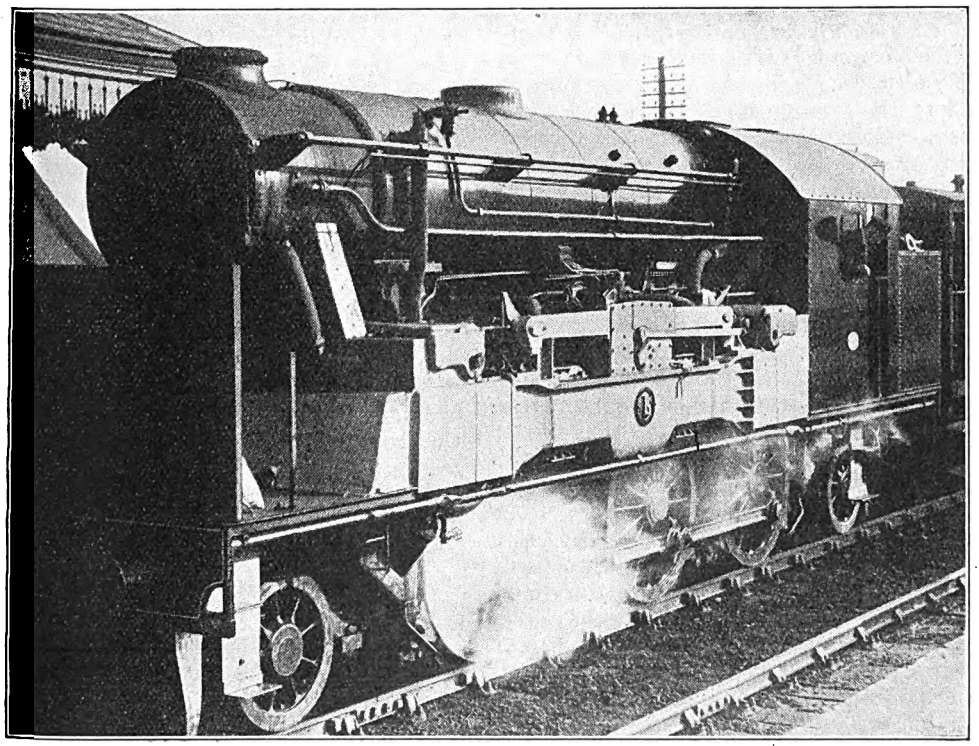
At this juncture, it will be advisable to mention that Mr. Collett has been good enough to send me a list of G.W.R. engines which were scrapped during last year. Among these engines are several that were dealt with in the February, March and April issues, as being apparently still in service. Accordingly, in order to prevent misapprehension, I have pleasure in giving particulars of those engines which have been withdrawn. (See previous page.)

With reference to the "Duke" and "Badminton" classes, slight alterations were made in the names of certain of the engines, as compared with those originally allotted. Of the "Dukes," No. 3258, *The Lizard*, was formerly *Lizard*; No. 3277, *Isle of Tresco*, was previously *Tresco*; and No. 3284, *Isle of Jersey*, was for a time *Jersey*. Since the lists of the "Dukes" were prepared, No. 3257, *King Arthur*, has had its name-plate removed. The above numbers are the present ones.

As regards the "Badmintons," No. 4410, *Charles Mortimer*, was originally *Mortimer*.

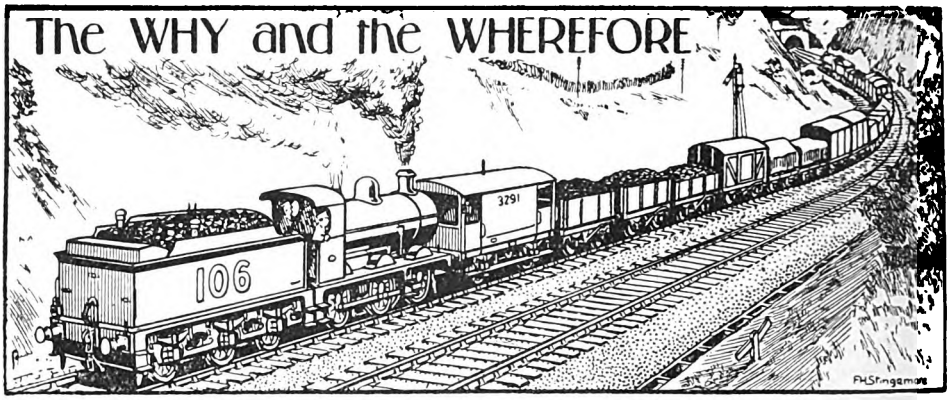
(*To be continued.*)

2-6-2 TYPE KITSON-STILL INTERNAL-COMBUSTION STEAM LOCOMOTIVE.



THE remarkable locomotive illustrated above represents the first application of the Still engine principle to railway locomotive purposes. It was built by Kitson & Co. Ltd., of Leeds. This view of the completed engine in the Ardsley yard, for which we are indebted to the *L.N.E.R. Magazine*, was taken by Mr. W. H. Turner, Goods Clerk, Bradford.

Digitized by Google



RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book"* (5s. *net*) *should be consulted. The thirtieth Annual Edition* (1927) *of this standard railway reference work is now published. All previous Editions are out of print.*

Picking up Water.

We cannot quite understand your difficulty as to the scoop being lowered before the train reaches the trough; we assume that you imagine it might foul the end of the trough. But you have to remember that, while the surface of the trough remains level, the rails are lowered on to it from both ends on a moderate gradient—usually about 1 in 300—so that the scoop, while clear of the end of the trough as the engine reaches it, is gradually lowered into the water by the passage of the engine over the falling gradient just mentioned. We cannot agree with the contention that, owing to the pressure of the water against the scoop, it is not the practice to raise it before the end of the trough is reached; on the contrary, from a fairly wide footplate experience, on a number of lines, with both power operation and merely mechanical operation of the scoop, we have seldom known the scoop to remain down for the full length of a trough. We have no information on the point raised concerning Stonehouse Viaduct.

[Reply to R. P. D. and C. R. H. SIMPSON.]

Speed Indicators.

Except for one or two experimental fittings, it is not the practice to equip British locomotives with speed indicators, whereas Continental express locomotives are often so fitted. On the French Nord and other lines self-recording indicators are used, not only indicating the speed to the driver, but also recording the speeds throughout on a roll of paper, which cannot be tampered with, but which on removal at the end of the journey shows the precise speed at which the driver has negotiated all speed restrictions, &c. This is a matter in which the Continent appears to be ahead of Great Britain. Apart from any such indication, the driver must depend, of course, upon sight and acoustics for his estimate of speed. So far as ordinary running is concerned, apart from the driver's observation of definite speed restrictions, his watch gives him ample indication as to the observance of times and booked speeds.

[Reply to D. G. GORDON.]

Swansea District Lines.

We think there is no doubt that the "cut-off" from Court Sart Junction at Neath to Llengennech, avoiding the congestion of Swansea and the difficulty of Cockett bank, was planned and executed in the expectation of much more extensive shipping developments at Fishguard than have actually taken place. Had the Cunard services to and from Fishguard been continued, there is no doubt that this route would have been employed by the

Digitized by Google

special trains, but as regards the ordinary services, Swansea is a centre of too great importance to be missed in this way. A special seasonal train to and from West Wales, on four days a week in the summer, is taken by this route, and it is also largely used by freight trains. You are doubtless aware that the final proposed section of the line cutting off the corner from Morlais Junction to Pembrey, and so avoiding Llanelly, was never constructed.

[Reply to R. D. JAMES.]

Gradients of Brighton Main Line, S.R.

As a special case, we give herewith details of the principal gradients between London and Brighton. From London Bridge to Croydon, the only grade worth mention is the 1 in 100 up from New Cross to Forest Hill. From Victoria, 1 in 64 on to Grosvenor Bridge, 1 in 166 (1½ m.), and 1 in 94 (⅜ m.), Clapham Junction up to Balham, and 1 in 126-264-100 Streatham Common to Selhurst are the worst ascents. From Windmill Bridge Junction to Coulsdon (5½ m.), 1 in 264 up, thence average 1 in 165 up to London end of Quarry Tunnel, and mostly 1 in 200 thence down to Earlswood. From Earlswood to Horley 1 in 264 down; 2 miles beyond Horley to London end of Balcombe Tunnel 1 in 264 up, thence 1 in 264 down almost to Wivelsfield; 1 in 264 up from ½ mile London side of Hassocks to Brighton end of Clayton Tunnel, and 1 in 264 down to Brighton. Other grades are negligible.

[Reply to C. G. HARRISON.]

Locomotive Mileage.

The record as to total mileage covered by any one locomotive is generally held to have been reached by the L. & N.W. 2-4-0 engine *Charles Dickens*, which for 20 years daily worked the 8.30 a.m. express from Manchester to Euston and returned with the 4 p.m. from Euston to Manchester, and in its 30 years of life from 1882 to 1912 is reputed to have covered 2¼ million miles. But very little of the original engine, taking into account the renewals carried out during this period, would remain at the end of its career. We have no information as to the "record" mileage of an engine between construction and the first general overhaul.

[Reply to "CREWE."]

Welsh Highland Railway.

Mr. D. G. T. Simpson points out that the Ordnance Survey Map shows that the Croesor Tramway, which leaves the Welsh Highland Railway at Croesor Junction, has been extended down the Llynlwnorddny Valley to join the Festiniog Railway near Tan-y-Grisian. We were not aware that the tramway had been thus extended, but, if Mr. Simpson is correct, the vehicle noted could have reached Minfford station, where exchange is made with the G.W.R., *via* either the Welsh Highland or the Festiniog Railway, in that they are connected through the streets of Portmadoc.

[Further reply to R. W. FITZJOHN.]

Fog Working.

Detonators are employed during foggy weather on all lines other than electric lines, which are fitted with trip-gear working in conjunction with the signals. It is quite possible that you may hear a number of detonators exploded without any stoppage of your train; if a distant signal were "on," for example, the driver would not be required to stop, although his attention would be directed to the necessity of cautious running; and by the time he reached the home signal to which the distant referred, the latter might have been pulled off, so that he would still be under no necessity of stopping.

[Reply to D. J. GORDON.]

Gradients.

The difference caused by measuring the horizontal ordinate of a gradient along the level or along the slope of the gradient itself is, in the vast majority of railway gradients, so infinitesimal that the point hardly arises. Theoretically, of course, the horizontal ordinate and vertical ordinate form the two sides of a right-angled triangle, of which the surface of the track forms the hypotenuse. We have no information as to the power classification, if any, of the L.M.S. "Garratt" locomotives, but we should imagine that it would rank at about 8 or 10, on a proportional basis.

[Reply to F. V. W.]

Locomotive Coal Consumption.

Coal consumption of the G.W. engine *Launceston Castle*, when working over the L.M.S. was not made public, and we are

Digitized by Google

therefore unable to give it. Average coal consumption of the "Kings" on the down "Cornish Riviera Express," when taking 14 cars from London to Westbury is, we believe, in the neighbourhood of 3½ tons between Paddington and Plymouth, given good weather. For information as to the coal consumptions of the other types mentioned, you should consult Mr. Cecil J. Allen's articles of February and March last.

[Reply to L. J., C. D. A., and R. H. B. M.]

Locomotive Acoustics.

We have previously explained that the relative loudness of locomotive exhaust depends largely on the way that an engine is being worked, in regard to regulator opening, cut-off, &c.; and this doubtless explains in large measure the question you raise as to different types making the ascent of Brentwood Bank. The 4-6-0 G.E. Section engines, having the largest cylinders of the three types you name, should normally make the quietest ascent, in the event of equal loading with the other types.

[Reply to F. LEMMON.]

Up and Down Trains.

We are somewhat surprised to find that any reader is not clear as to the use of the terms "up" and "down" trains. The general application is that trains from the London direction are referred to as "down," and those proceeding toward London as "up." There are, however, many places where this distinction is not altogether applicable, in which case a conventional application is adopted, usually based upon the distinction shown in the railway companies' working and public time-tables.

[Reply to A. C. STEPHENSON.]

Horwich-built 4-6-0 Express Engines, L.M.S.

Dimensions of this type are as follows: Cylinders (4), 16½ in. by 26 in.; coupled wheels, 6 ft. 3 in. diameter; working pressure, 180 lb. per sq. in. On the usual 85 per cent. working pressure basis, therefore, the tractive effort is 28,880 lb., as correctly stated by us in the February issue. There have been no published details of the conversion of No. 10456 of this type to compound working, and we have reason to believe that the experiment was not successful.

[Reply to R. HOGAN.]

L.M.S.R. Locomotive Colours.

We understand that while the "Royal Scot," "Claughton," "Hughes" and "Prince" 4-6-0's and compound 4-4-0's will continue to be painted red, all other passenger locomotives are to be painted black, with red lines, goods locomotives being painted plain black. Engines will also bear the letters L.M.S. on the tender or tank sides, the number being placed on the cab sheets or bunker sides. We have no information as to why a newly-painted wagon should still be lettered G. & S.W.

[Reply to E. J. F.]

Highest Railway Summits in England.

The highest railway summit in England is located on the Burnhill and Stanhope mineral branch of the L.N.E.R. (North Eastern Area) at Parkhead, where the line is 1,474 ft. above the sea. On routes used by passenger trains, Waenavon, between Bryn Mawr and Pontypool, L.M.S., is 1,400 ft. above sea level, and takes the record, followed by Princetown (Dartmoor), G.W.R., 1,373 ft., and Stainmore, between Barnard Castle and Kirkby Stephen, L.N.E.R., 1,370 ft.

[Reply to J. L. SUTCLIFFE.]

L.M.S. Tank Locomotives.

By the "Baltic" tanks of the L.M.S. we assume that you refer to the Horwich design (though there are actually three other tank types of this wheel arrangement in use on L.M.S. metals). The Horwich 4-cylinder 4-6-4 tanks rank with the 4-cylinder 4-6-0 passenger engines in Class 5; the new 2-6-4 tanks are, we believe, in Class 4. As the 2-6-4 tanks are 2-cylinder engines, obviously only two sets of valve-motion are required.

[Reply to F. COOPER.]

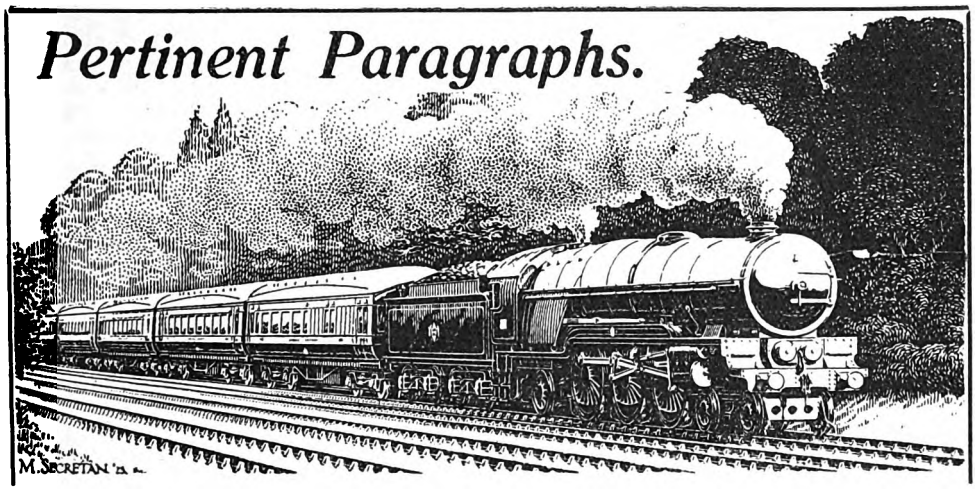
New Locomotive Programmes.

We have no further information as to the design of new locomotives included in the new construction programmes of the L.M.S. and Southern Railways beyond that already given.

[Reply to "CONSOLIDATION."]

Digitized by Google

Pertinent Paragraphs.



L.N.E.R. Poster Art Exhibition.

THE London & North Eastern Railway Company's annual exhibition of poster art was held in the New Burlington Galleries. The board room at King's Cross station was all very well for a start, but it was impossible in a space so restricted and so indifferently lighted to do anything like justice to the merits of the exhibits—the work, be it remembered, of some of the leading artists of the day. In removing the exhibition to more appropriate surroundings, Mr. C. G. Dandridge, the Advertising Manager, has proved himself a worthy successor to Mr. W. M. Teasdale, on whom the brunt of organising the exhibitions has hitherto devolved—with what success the world in general and the railway section thereof in particular, is well aware. It is gratifying to record that the latest display of poster art, which opened on March 23, was in all respects an unqualified success. The collection totalled 128 exhibits, and included a number of posters which long ago gained popular approval and have become world famous—such as Mr. Frank Brangwyn's powerful "North East Coast Industries" and Mr. Fred Taylor's splendid conception of "York Minster Windows." In addition, there were also shown a series of framed booklet covers by well-known artists.

Metropolitan Railway A.A. Concert at Queen's Hall.

ON Friday, March 30, a large audience assembled in the Queen's Hall for the sixth annual Bohemian concert arranged by the Metropolitan Railway Athletic Association. The chair was occupied by the Right Hon. Lord Aberconway, P.C., Chairman of the Metropolitan Railway Company, who was supported by many directors and officers of that company and also of other companies. As usual, a principal feature of the concert was the engagement of the band of H.M. Grenadier Guards, by permission of Colonel Lord Henry C. Seymour, D.S.O., and under the direction of Captain G. Miller, L.R.A.M. Before the concert Mr. Alfred Harriss gave a short organ recital, also taking part in the programme, while Mr. David Richards was accompanist at the piano. An interesting programme was provided by a number of well-known artistes, their contributions, together with those of the band, providing a highly-appreciated evening's entertainment The arrangements were made by the Concert Committee, of which Mr. T. Wilding is chairman; Mr. Sidney Brown, Hon. Musical Director; and Mr. W. R. Squire, Hon. Secretary.

Complex Train Formations.

FOUR trains which leave terminal stations in London between the hours of 10.30 and 11 a.m. have probably no parallel in Great Britain, over a similar period of time, in the extraordinary complexity of their train formations. The 10.30 a.m. "Cornish Riviera Express" out of Paddington leads the way with nine portions, the main train serving Penzance, while independent through coaches are run for St. Ives, Falmouth, Newquay, Kingsbridge, Exeter, Ilfracombe, Minehead, and Weymouth. The "Atlantic Coast Express," leaving Waterloo half-an-hour later, is a close second, the main Ilfracombe train in this instance having attached through coaches for Plymouth, Padstow, Bude, Torrington, Exeter (the restaurant car), Exmouth and Sidmouth, eight portions in all. Northwards from London the 10.30 a.m. L.M.S. express out of Euston regularly takes portions for Liverpool (Lime Street)

Digitized by Google

and Manchester, as well as through coaches for Southport, Halifax, Colne and Birkenhead, while a frequent addition is a through boat portion for the Riverside Station at Liverpool. Only five minutes later there departs from Euston the 10.35 a.m. train, with a main portion for Carlisle, a restaurant car for Preston, and through carriages to Windermere, Whitehaven, Llandudno, Pwllheli and Swansea. These four trains, therefore, between them incorporate no less than 29 sections daily, and not infrequently thirty—surely a British record in the matter of through coach facilities in so short a period of departure as one single half-hour.

Locomotives and Track.

A DISCUSSION on "Points of Common Interest to the Permanent Way and Rolling-Stock Engineers" was recently held jointly by the Permanent Way Institution and the Institution of Locomotive Engineers. It emphasised the value of joint conferences and free discussion of problems and conditions which affect more than one department, though we are not prepared to endorse the suggestion of one speaker that the civil, mechanical and electrical departments should be combined. Modern railways are operated on far too big a scale to justify that, but there is certainly scope for further measures to enable men in each department to be made aware of the problems of those in other sections. Mr. F. T. Bowler, Assistant Divisional Engineer, London, G.W.R., spoke on the permanent-way side, and Mr. H. Holcroft, Technical Assistant to the Chief Mechanical Engineer, Southern Railway, on the rolling-stock side, both giving interesting addresses. The increase in axle loads was the subject of considerable comment. The other outstanding point raised, especially in the discussion, was the very heavy wear of rails associated with electric traction. After summarising the discussion, and adding some comments of his own, the Chairman, Mr. Cecil J. Allen, suggested that it all came down to the question: "Are our locomotives being developed to too great weight for the work they have to do, or is the track sufficiently developed to meet demands?"

Wirral Railway Locomotives.

MR. THEODORE G. HERON writes:—"The locomotive referred to by a Derby reader in the February issue, as belonging to the Wirral Railway, must have been one that was acquired by that company from the old L. & N.W.R., as the Wirral did not possess any of their own with the 2-4-2 wheel formation. It would be interesting to know the number of the engine your correspondent observed on the Keswick line. I think it must have been No. 4 or No. 11. There were three 2-4-2's purchased from the L. & N.W.R., the third, No. 16, having the number painted on the side of the tank, and not possessing a Wirral Railway nameplate. The remaining 2-4-2T, which did service on the Wirral line was an old Lancashire & Yorkshire engine. This engine is still employed on that section of the L.M.S. and has been renumbered and painted red. While on the subject of Wirral locomotives, the only original one remaining on the line is No. 3, constructed by Beyer, Peacock & Co., in 1914. This has been renumbered but is in the black livery."

The Railways of West Cheshire.

COMMENTING upon Mr. R. S. McNaught's article in the April number, Mr. A. P. Herbert states that one of the Sentinel-Cammell cars was working into New Brighton in the summer of 1926, but now almost all trains are worked by the L.N.W. 0-6-2T. "As regards the L.N.E.R. in this district, some exceptionally cheap excursions were run throughout last summer between Seacombe and Caergwle in Wales. From memory I believe the fares were 1s. 6d. return on Sundays and 1s. 3d. on weekdays when run. I well remember last August Bank Holiday Monday when several reliefs had to be put on, and there was one constant stream of passengers crossing from the landing stage to the station at Seacombe, as each ferry boat discharged its passengers.

"Incidentally, I recently saw one of the few remaining Mersey Railway steam engines. This was a 4-4-0T No. 2, painted red, at Birkenhead, Green Lane station. As regards the working of the G.W. crack expresses to Paddington by L.N.W. locomotives, I had on one occasion the pleasure of travelling by the 11.45 a.m. out of Birkenhead behind L.N.W. 2-4-2T 6648."

Isle of Man Railway.

As a result of the spirited policy adopted by the directors and management with the willing co-operation of the staff, the Isle of Man Railway Company has entered on a new lease of life. The introduction last May of fierce road competition for both passengers and goods was encouraged in every possible way by local authorities whose districts had been practically "made" by railway facilities. How severe was the competition may be judged from the fact that at the height of the season there were 40 buses running parallel with the railway, which has a total length of only 46¼ miles. An answer to this challenge was soon forthcoming. The railway company's summer time-table was scrapped, and the services on every route were

Digitized by Google

intensified and improved, the keynote of the new policy being "100 Trains Daily and Pre-War Fares." Motor lorries were purchased, with the result that the handling of passengers' luggage has been immensely accelerated, and the company has embarked upon numerous contracts for the conveyance of goods by rail and motor to any part, and business in this direction is developing. The new steamer connections have also evoked favourable comment, and the two-day Island tour inaugurated in the middle of the season at once proved a great success.

A MODERN RAILWAY NOTICE IN PRE-RAILWAY STYLE.

Rail Coaches on the L.N.E.R.

THE L.N.E.R. have now completed their orders for a fleet of 50 rail coaches to be supplied by the Sentinel Waggon Works and Cammell Laird & Co. Ltd., and by Clayton Wagons, Limited. These are the largest individual contracts ever placed by a railway company for self-propelled rail coaches, and as the new vehicles are received they are being named and placed into service. The intention is to operate them on selected sections of the L.N.E.R. in order to provide more intensive services, and to follow the fluctuations of public requirements, including market days, shows, local events, sports meetings, &c.

The steam rail coaches have seats for 60 passengers and straps for additional travellers should the necessity arise. Each coach is equipped with steam heat, electric light, and automatic brakes, and is signalled throughout as safely as an ordinary train. A high boiler pressure of 275 lb. per sq. in. enables a speed of from 40 to 50 m.p.h. to be attained, and special attention has been given to the powers of acceleration of these rail cars, which can be run in either direction without reversing.

The steam coaches are to be decorated in two distinctive colours—vermilion and cream, and green and cream—and in order that they may be better known to the public, each coach will be named after a famous road stage coach of olden days.

In the interior of each coach an interesting framed notice (which we reproduce) is fitted, giving particulars of the running of the old stage coach after which the rail coach is named, and offering 5s. reward for supplying to any L.N.E.R. stationmaster hitherto unpublished information relating to the old horse coach.

The following names have already been allotted :—

Tally Ho	*The Red Rover*
The Highflyer	*The Royal Sailor*
The Rockingham	*The Yorkshire Hussar*
The Phœnix	*The Wonder*
The Perseverance	*The Wellington*
The North Star	*The Express*
The Neptune	*The Union*
The Liberty	*The True Blue*
The Hero	*The Rodney*
The True Briton	*The Railway*
The Trafalgar	*The Eclipse*
The Transit	*The Ebor*
The Teazle	*The Comet*
The Rob Roy	*The Bang Up*
The Rapid	*The Chevy Chase.*

South African Railways Reorganisation.

THE Transportation, or Unit, scheme of organisation was introduced on the Union of South Africa Railways nearly 20 years ago, and during that long period, in which the country has shown phenomenal development, it has well served its purpose. But the

Digitized by Google

railway of 7,041 miles in 1909 has now grown to 13,000 miles, and as it is considered that greater devolution of authority is essential, important changes are to be made in the methods of organisation, although the main principles of the present scheme are to be retained. Instead of four large "systems," each containing more or less self-contained divisional units, there are, in future, to be nine smaller "systems," each in charge of a manager reporting directly to headquarters, where two Assistant General Managers, one for commercial and operating affairs and the other to deal with technical questions, have been appointed to assist the new General Manager, Mr. J. R. More. Other changes include the abolition of the posts of Financial Assistant and Assistant Chief Civil Engineer, the duties of the former position being merged with those of the Chief Accountant, who will thus have complete control of finances.

How Railways are Run in China.

MR. J. BLAND, writing from Aldeburgh, sends a cutting from the *North China Herald* containing some interesting and in some respects amusing information concerning the Chinese railways. Speaking of the Lung-hai Railway, the writer thus comments :—

Long ago, this railway abandoned the practice of fixed time-tables. It is well known that arbitrary rules for the starting of trains or their arrival at destination have been exceedingly irksome to the Chinese, who regard such stringent regulations as imported "imperialism," against which every patriotic Chinese heart revolts. They never have been able to see any reason why there should be any set time for starting anywhere, for, since the dawn of Chinese history, every Chinese has taken his own time to do his travelling and, when this railway came entirely under their own management, promptly they threw all schedules into the fire and ran their trains according to their own sweet will. They admit the results are not wholly satisfactory, as the sweet will generally is that of the train crew and not of the travelling public. "Still," our friends are fond of telling us, "the Chinese can only learn by experience, and it must be remembered that they have their own contributions to make to progress, &c."

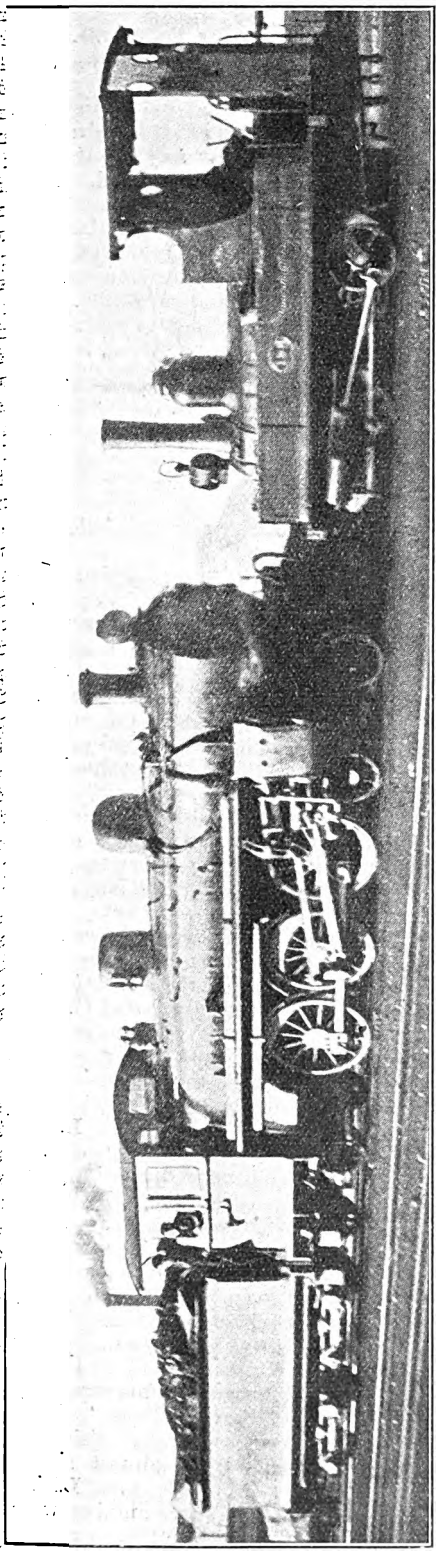
The Lung-hai railway also has solved one very vexing problem—how to get rid of the foreigners who supervised the building of the road and who were employed in a subordinate capacity for its repair and upkeep. This they accomplished by the very simple expedient of not paying their salaries. When one thinks of the long drawn-out negotiations that would have been necessary, had they proceeded through the usual diplomatic channels, this method will appear to be a stroke of real genius !

Then follows a delightful story concerning the transit of a 20-ton car of kerosene from Haichow to Hsuchowfu, a distance of 118 miles. The story is too long to tell in detail, but may be thus summarised. As there had been no trains for some days, the first step was to ascertain if transportation could be secured. As all the stationmasters had been got rid of, negotiations had to be conducted with the soldiers, who found the railway stations very convenient barracks. On being assured that a vehicle was available, the next step was to make a payment in advance, which would, in this case, be $220, plus a 20 per cent. surcharge due to the scarcity of cars, and an additional tax of 35 per cent. This brought the figure to $341. These were, however, railway charges, and there would be a further fixed charge of $8 per ton for the military authorities. This brought the total to $501. The regular import tax on kerosene added a further $50, plus a tax of 40 cents per unit of oil for the Chamber of Commerce, so that the charge now became $791. It was further necessary to add an export tax, after which arrears of police pay made another charge of $2 per ton, and as there were three kinds of police this had to be paid three times. Finally, as the soldier was filling the place of station agent as a purely voluntary service, for which he received no pay from the railway, he was compelled to ask for a gift of $20 per car. At this stage the total had become $976. Then came the necessity for an engine, and after much bargaining, including the purchase of coal at something like $22 per ton, the train started, apparently as a combined effort with seven other firms who had each secured a car. The load was, however, too much for the ancient engine, so that the services of 200 coolies were secured, and eventually the consignment reached its destination, at the cost of a bill of $1,200 and some cents !

L.N.E.R. Suggestions Scheme.

A SUGGESTIONS scheme for the L.N.E.R. has been announced. As Sir Ralph Wedgwood points out in an explanatory letter successful railway working depends more and more on the application of new ideas. The staff have given notable help in this direction in the past, but there is no doubt that their help can be made even more effective. The scheme has therefore been devised to provide machinery for collecting these ideas and for bringing them promptly under impartial investigation by a representative committee specially appointed for the purpose. The scheme provides for monetary awards for suggestions which are considered worthy of recognition, and for secrecy should that be desirable or preferred. Where the suggestion takes the form of an invention the arrangement covers

Digitized by Google



50 YEARS OF LOCOMOTIVE DEVELOPMENT IN NEW ZEALAND.
Modern "A" Class 4-6-2 Locomotive and old "A" Class 0-4-0 Locomotive (1873.)

assistance by the company in regard to taking out Letters Patent. The names of those to whom awards have been made will be published periodically in the *L.N.E.R. Magazine* (with the consent of the individuals concerned), and the fact of an award having been made will be recorded.

Liverpool Overhead Railway.

A MORE encouraging account of this company's affairs was placed before the shareholders at the recent annual meeting. Receipts were, of course, better in 1927 than in 1926, and, although they were below those of 1925, there has been a satisfactory decrease in expenditure. The operating ratio was reduced from 99 per cent. in 1925 to 89·21 per cent. in 1927. As from June 18 last, the company ceased to generate its own current, and is now obtaining its supply from the Liverpool Corporation. The arrangements are working most satisfactorily, and will result in considerable economy. A more ambitious advertising scheme is being embarked upon, and among the new facilities granted is that a passenger purchasing a round-trip ticket will be entitled to a permit to view one of the large liners. For facilitating traffic during the busy periods the company has converted three two-coach trains into two additional three-coach trains, which have proved themselves to be very suitable for the purpose.

Articulated Carriages in Argentina.

THE Central Argentine Railway has recently introduced articulated cars on the express trains running between Buenos Aires and Rosario—the fastest service in South America. This is claimed to be an innovation in Argentina, and it is stated that the new vehicles are the longest and heaviest so far built on the articulated principle. Six-wheeled bogies are adopted at the articulated joint. The twin cars comprise a first-class unit and a kitchen and restaurant unit. Extreme length over buffers is 135 ft. 10 in., centres of bogies for each unit being 55 ft. apart. The total height of the vehicles from rail level is 13 ft. 3¾ in. and the width over body 10 ft. 4¾ in. Owing to the increased dimensions and weights a special design was made for the articulated pivoting and side friction bearings, fitted with strong safety chains. The whole of the underframe and bogies were built in England, but the carriage bodies were constructed in the Central Argentine Railway Workshops at Rosario. To meet the requirements of a recent Government decree steam-heating apparatus has been installed. It is stated that the articulated principle was introduced partly in the nature of an

Digitized by Google

experiment; and that the results so far obtained have fully realised expectations.

Splendid Timekeeping of West Riding Pullman Expresses.

DURING the year 1927 a number of runs on this popular express were authentically recorded by a frequent traveller under varying conditions of weather, and a fine average of consistent, fast running is revealed by his analysis which follows. The "West Riding Pullman" is scheduled non-stop each way daily between London and Wakefield at a throughout average speed of 56 m.p.h. Over the major intermediate portion of the run, however, viz., between Hatfield and Doncaster, the passing times in either direction call for an average of 58-59 m.p.h. for 138 miles in either direction. The distance is almost 176 miles, allowed 187 minutes up and 188 minutes down, and in all the cases under notice G.N. "Atlantic" type locomotives were employed. The standard load of six cars gives a total weight of about 265 tons behind the tender.

Twenty-four down trips by the 11.10 a.m. from King's Cross produced an average net time of 186 minutes for the 176 miles to Wakefield, or two minutes under schedule. Seven of the arrivals at Westgate station were from one to four minutes before time, five were exactly punctual, and the remainder were, on the average, three minutes late, owing principally to delays near the conclusion of the runs. Only on one of these 24 runs was time actually lost by the engine in running, and this was on a tempestuous winter's day when the locomotive dropped two minutes and was hauling seven instead of the usual six cars.

One dozen runs on the corresponding return train from Halifax, Bradford, Harrogate and Leeds, commencing in each case at Wakefield, at 12.13 p.m., and due King's Cross 3.20 p.m., with similar engines and average load, were particularly fortunate, as delays were few. On no less than 11 out of the 12 occasions the London terminus was reached before booked time, the "credit" being from one-half to four minutes. On the remaining trip, after time had been gained steadily all the way from Doncaster to Hatfield, a dead stand occurred for signals at Holloway Road, which resulted in a late arrival at the terminus, but only to the extent of one minute, thanks to the time previously in hand. On the most notable occasion, a stop of five minutes was made at Grantham for water owing to the pick-up apparatus having failed temporarily, and yet King's Cross was reached one minute early. The 105½ miles from starting at Grantham to stopping in London occupied barely 105 minutes, so that just over 60 m.p.h. was maintained all the way, notwithstanding very much higher speeds than that at many points.

The net times are arrived at after deducting a fair allowance, based on average unchecked runs over similar courses, for signal, track repair and other delays which must be to some extent inevitable, but are beyond the control of the driver. Maxima of from 75 to 80 m.p.h. were maintained on several occasions for 30 miles and upwards. An interesting pamphlet is supplied to passengers on the L.N.E. Pullman trains giving, besides a map and some topographical details, the actual mileage to, and passing times at, all principal points.

A Railway Story and Some Locomotive Coincidences.

MR. R. S. MCNAUGHT sends the following story:—

"On the occasion of an English Cup semi-final match in Manchester, when two Yorkshire clubs were engaged, an unusual number of special trains arrived at the various terminals in that city. An auto-train, consisting of four coaches propelled by an 0-6-2 tank engine in the middle, was steaming out of one station and excited the curiosity of a party of enthusiastic Yorkshiremen. One gave it out as his opinion that the unusual arrangement was a 'special' for the two teams, the engine being placed between the parties to guard against an excess of fraternisation or its opposite!"

MR. MCNAUGHT also writes as follows:—

"The reference in last month's issue to the coincidence of L.N.W.R. No. 1 (which still retains its original number) and G.W.R. No. 1 being together in Woodside station, Birkenhead, recalls several other similar happenings which were unnoticed except by the keen observer. At Chester (General) station upon a recent day, L.M.S. "Claughton" class engine *Lady Godiva*, working in from Llandudno Junction, was followed within a few minutes by Great Western *Lady Godiva* with a train from Paddington and Birmingham. The latter is, of course, one of the well-known two-cylinder 4-6-0's. Another coincidence with somewhat poignant significance was the juxtaposition at neighbouring platforms of *Queen Alexandra* (Great Western 4-6-0) and *King Edward VII* (L.M.S. former Webb compound).

"The respective 'New Zealands' of the same two companies have also visited a station on the Joint Line almost simultaneously, while at Carlisle two L.M.S. locomotives bearing the same number were exchanged on an up Scottish express.

Digitized by Google

Nos. 1111 and 11111 (Midland type compound and L. & Y. type 4-6-4 tank) have been observed together at London Road Station, Manchester. Two of the well-known 'Precursor' class bearing the names *Cerberus* and *Psyche* were once hauling a mail train, and the writer heard a jocular fireman remark that 'There ought to be some good going with "Cerebos" and "Physic."'

New Signalling at Limpley Stoke, Bathampton and Trowbridge Line, G.W.R.

MR. J. GEORGE, of Bath, sends particulars of the signalling changes which have been made at Limpley Stoke:—"There were formerly two signal boxes at Limpley Stoke, the South (32 levers) controlling the shunting yard between Limpley Stoke and Freshford, and the North (31 levers) controlling the junction for the Camerton branch. The branch traffic per day consisted of one goods train up to Camerton and two down (one worked round from Frome), and a rail motor car made two trips in each direction. But now there is no passenger traffic, and only one goods train each way. The North box now contains only five levers controlling the points and signals between branch and main line, and is worked by the station porter, under distant control from the South box (now 34 levers). The latter has taken over the whole of the main-line traffic, using some of its own old signals and some that belonged to the old North box. Among these last is the up distant signal, which is manually worked. Both up and down main lines are track circuited from the South box to the north side of the station, as parts are out of the signalman's sight. When it is desired to work a goods train from the yard on to the branch, the South signalman pulls over an electric interlocking switch, which locks all his own down main line signals and allows the North porter to pull off the points and signals for the branch. For a branch train in the opposite direction, the same switch is pulled, the porter pulls off his levers, and the train comes off the branch on to the down main line, travelling on it for 550 yards in the wrong direction until it reaches a crossover near the South box (see plan). I imagine that this type of working is somewhat rare. These two goods trains are worked by 0-6-0 tank engines and average forty wagons."

A Christmas Snowstorm Accident.

COLONEL SIR JOHN PRINGLE'S report to the Ministry of Transport on the accident which occurred on December 26, between Higham and Saxham, L.N.E.R., has been issued. The 12.50 p.m. train (Sheffield to Felixstowe) after its arrival at Ely was, owing to the heavy fall of snow, diverted from its normal route over the Soham-Fordham branch to travel *via* Cambridge and Newmarket. After passing Higham station on the down line, the train was eventually brought to a standstill about 8.20 p.m. in a snowdrift at the home signal for Saxham station. A following light engine from Higham on the same road collided with the rear of the Sheffield train about 8.30 p.m., whilst the latter was standing, unable to proceed. Later, about 8.53 p.m., the 6.40 p.m. slow passenger train (from Cambridge to Bury St. Edmunds) collided with the light engine. Two passengers in the Sheffield train, the driver of the light engine, and the guard of the 6.40 p.m. train, were injured in the second collision.

The Sheffield train was drawn by 4-4-0 No. 8894. The light engine was 2-4-0 No. 7470, and the Cambridge train was drawn by 2-4-0 No. 7469. The first collision between engine No. 7470 and the Sheffield train was light in character. The second collision was more serious and both engines, Nos. 7470 and 7469, were damaged. At the time of the accident snow was not actually falling, but, as the result of a northerly wind which was blowing in gusts over the snow-covered fields, snow was drifting into the cutting so that the rails were buried at places to a depth of 2 or 3 ft.

The scene of the accident was the double line between Newmarket and Bury St. Edmunds. It is clear from the evidence that all those engaged in operating traffic were faced with great difficulties, while the breakdown of all means of communication necessitated special working. In two or three respects action taken by certain of the men concerned is criticised, and a degree of blame is attributed to some of them. It is suggested that certain of the rules applicable under the circumstances should be revised to avoid any risk of misunderstanding.

Preservation of Historic Locomotives.

THIS topic, raised by Mr. O. J. Morris, with particular reference to a Brighton "Terrier" on the Kent & East Sussex Railway, has attracted several interesting letters. Mr. C. Hamilton Ellis writes:—

I fully realise that it is impossible to preserve every locomotive that recalls memories of one-time fame; indeed, there are many that have claims in this respect, such as Johnson's "Single," Beattie's well-tank, Drummond's old single on the late Caledonian Railway, formerly No. 123, to say nothing of many "fine old gentlemen" that have now joined the ranks of the scrapped. Surely, however, something might

Digitized by Google

be done to save a "Terrier" from the great majority; and, as Mr. Morris remarks, the *Rolvenden* is a particularly interesting member of the "Terrier" class. The Kent & East Sussex Railway still possesses what is probably the oldest passenger carriage in service in Great Britain, so perhaps a place may yet be found for the old *Rolvenden*. Messrs. Bernard L. Dawson, A. F. Wallis, R. W. Lawrence and J. G. Stuart also write in support of the proposal.

English and American Railways Compared.

COMMENTING on various references which have been made in "Pertinent Paragraphs" and in other parts of the RAILWAY MAGAZINE from time to time, Mr. T. Wood, writing from Logal Avenue, Winnipeg, Canada, discusses some of the statements which have been made. He refers, first, to general newspaper comments as to remarks alleged to have been made by the driver and fireman of the G.W.R. locomotive *King George V* during its recent visit to the United States, taking up particularly the suggestion that "they had scared the life out of some American railway officials" by running at 75 m.p.h. between Baltimore and Philadelphia. Statements to this effect appeared only in the general press, the explanation being, we understand, not that extreme speed was attained, but that there was a tendency to run faster than the restrictions of the route in question justified. We believe, in fact, that the suggestion that the G.W.R. enginemen were running too fast was mainly due to the fear that they would not reduce speed, in view of a curve restriction ahead, in sufficient time.

Referring back to comments in the April, 1927, number, Mr. Wood suggests that "to compare mechanical equipment, operating or other conditions as applied on this side of the Atlantic against British or European practices is more or less futile and generally raises Cain with somebody's peace of mind." In this connection, it is necessary, therefore, to consider the following points in regard to American practice :—

1. The average locomotive tonnage (weight) is double, sometimes triple, that of European standards.

2. The average tractive effort is easily 50 per cent. greater.

3. Passenger equipment is twice as heavy, likewise carrying capacity twice as great.

4. Freight equipment is two to three times as heavy and three to six times larger in carrying capacity.

5. The loading gauge has an advantage of from 2 to 4 ft.

6. The average tonnage per train hauled is twice as great in passenger service; three and four times more in freight movement.

"Number five, I think, is the keystone, coupled with the economics of handling heavy tonnage trains long distances through low-revenue-bearing territory. Then there are temperature extremes, and fuel and water problems not met with on the other side."

Influence of Coal on Design.

MR. WOOD adds some further remarks as to the difficulties experienced with British locomotives owing to the poor quality of the foreign coal used during and after the strike of 1926. In this connection, he asks whether British locomotive practice could maintain its present high-grade performance if it were necessary to use this grade of coal regularly, bearing in mind that, on his side of the Atlantic, performance is, with but one or two exceptions, carried on twelve months of the year with low-grade bituminous coal. "Many firemen use more expressive adjectives in describing it." He does not, however, fully appreciate the point that British locomotives are designed for using coal of a good quality, and the difficulties experienced were due not so much to the fact that they were using poor coal as to the reason that they were not designed with that purpose in view. In any case, although American locomotives may largely use relatively low-grade fuel, they have the large fire-box and other features which enable them to make the best use thereof. Moreover, while many of the other remarks which Mr. Wood gives in his somewhat lengthy letter afford interesting reading, they simply go to support his main claim that conditions are so different in the two countries that comparisons cannot fairly be made.

He also makes some comments based upon remarks quoted from Mr. St. John Ervine as to American sleeping cars. In this connection he says: "In taking a final crack at Mr. St. John Ervine, let us suppose that if the distances in Great Britain were comparable to those traversed by our transcontinental lines, would it be reasonable to expect the English companies could maintain a fleet of individual compartment-sleeping cars as are now in use and show profit? Would the revenue derived begin to cover the cost and heavy expenses of upkeep? It is doubtful. Are the sleeping cars now in service actually a paying proposition, or are they a necessary evil run for the convenience of the small percentage of the travelling public who find it necessary to travel at night?" He ends his letter as follows: "You will generally find the average railroader of this Continent, who has seen for himself, has great admiration for the practices in being in the British Isles—they are

Digitized by Google

second to none; on the other hand, so are ours, but, for the love of world peace, do not try to compare the two; it spoils the taste. They both have their place in the sun."

L.N.E.R. Train Services in Scotland.

COMMENTING upon the article published in the January number, "From the Forth Bridge to Alloa and Stirling by the L.N.E.R.," Mr. F. A. Plant writes as follows:—"Clackmannan Road station has not appeared in the public time-table for some time, and I do not remember seeing it at all since I began the study of railways. The writer also says that the 10.35 a.m. train is a stopping train to Stirling. The 10.35 (now 10.37) is an all-stations train from Edinburgh to Dundee, the Stirling train being a local starting from Inverkeithing in connection with the Dundee train. Again, the 6.37 p.m. train from Edinburgh is described as a Stirling train, whereas it is correctly described previously as a Perth express. The Stirling connection in this case is from Dunfermline (Lower) at 7.19 p.m., the express arriving at 7.2 p.m."

Mr. Plant also makes reference to remarks published in the March, 1927, number, commenting on the article on "Edinburgh and Glasgow Routes of the L.N.E.R.," published in the January and February, 1927, numbers. He points out, in connection with "Staffordshire Knot's" remark that there are at least six booked passenger trains using the direct line from Cowlairs to Maryhill (Glasgow), that, besides those mentioned, there are two others which are more difficult to discover. "The first of these is the 9.26 a.m. Glasgow (Queen Street, Low Level) to Balloch, first stop Singer.

"This train apparently starts from Dalmuir at 8.57 a.m., arriving at Queen Street at 9.19 a.m. At 9.26 a.m. it goes out eastwards past Bellgrove, thence northwards past Alexandra Park and Springburn stations, thence on to the Edinburgh main line for a short distance, after that passing on to the direct line to Maryhill, then on to the line to Dumbarton *via* Singer, passing Westerton and Drumchapel stations, finally making its first stop at Singer, after traversing a very unusual and interesting route. On Saturdays a train leaves Balloch at 12.5 p.m., runs *via* Dumbarton, and the Singer route to Queen Street (Low Level), after serving all intermediate stations. Arriving at the last station mentioned at 1.6 p.m., it leaves again at 1.12, and runs over the route described as far as Westerton, where it makes its first stop, thence serving the stations on the Milngavie route."

Clyde Train and Steamer Services.

MR. PLANT then adds some remarks on train and steamer developments on the Clyde coast, which applied during last summer, as follows:—"In the summer season of 1927, several alterations and improvements featured in the Clyde coast time-tables, compared with previous years. On Saturdays a steamer left Wemyss Bay for Rothesay at 12.50 p.m. in connection with the 11.50 a.m. train non-stop from Glasgow to Wemyss Bay in 50 mins.; at 6.20 p.m. a steamer left Rothesay on the same day for Wemyss Bay, connecting with the 7 p.m. train from Wemyss Bay arriving Glasgow 7.59 p.m. On Saturdays, also, a train left Glasgow (Central) at 11.55 a.m., Paisley 12.7 p.m., and Gourock 12.38 p.m. The steamer *Jupiter* then served Dunoon, Kirn and Huntersquay, leaving at 12.45 p.m. From Monday to Friday, inclusive, there was no sailing given at 1.10 p.m. from Fairlie to Millport in connection with the 11.35 a.m. train from Glasgow (St. Enoch), as in 1925 and previous years, but on Saturdays there was a steamer at 1.22 p.m. from Fairlie to Millport, the connection from Glasgow leaving at 12 noon. On the Ardrossan-Arran route, the 1.8 p.m. Saturday train from Glasgow (Central), connecting with the 2.15 steamer *via* Whiting Bay, was replaced by the 12.30 p.m. train, with the steamer leaving Ardrossan at 1.35 p.m. Important alterations were made in the services of the L.N.E.R., Williamson-Buchanan, David Macbrayne, and Campbelltown and Glasgow companies steamer sailings. The chief of these, I think, was the re-introduction of a morning and evening sailing from Lochgoilhead to Gourock and *vice versa* (during July and August), Messrs. Macbrayne's motor vessel *Comet* carrying on the service."

The Twentieth Century Limited.

THIS famous train, the principal New York Central express between New York and Chicago, has been running now for 25 years, having been instituted in 1902. It covers the 960 miles in 20 hours. Westbound, it leaves the Grand Central Terminal, New York, at 2.45 p.m. (Eastern time), reaching La Salle Street station, Chicago, at 9.45 a.m. (Central time). Returning, the train leaves Chicago at 12.40 p.m., New York being reached at 9.40 a.m.

There is a stenographer in attendance (his services are free), who also looks after the receipt and despatch of telegrams, etc., in conjunction with messengers who attend the train; telephone connections are made before the trains leave Chicago and New York; there is a ladies' lounge, with a

Digitized by Google

maid in attendance; stock market quotations are posted in the Club car, where newspapers, etc., are provided and a postal box installed; and there is a barber and valet, except that on Sundays the barber service is not given in New York State, to comply with the State laws. There are also shower baths, etc. Meals are provided at suitable times.

We are indebted to Mr. Eric Crickmay for a pamphlet giving particulars summarised above. He points out that the train is usually run in two or more sections, occasionally as many as seven in one day; and at the same time directs our attention to a number of interesting items.

GREAT WESTERN RAILWAY

TIME TABLE

FOR

The Journey of Their Majesties the King and Queen of Afghanistan From Paddington to Swindon

On Wednesday, March 21st, 1928.

FORWARD JOURNEY.

DISTANCE FROM PADDINGTON	STATIONS.		TIMES.
Miles			
—	PADDINGTON	*dep.*	1.30 P.M.
24¼	MAIDENHEAD	*pass*	1.57 P.M.
36	READING	"	2.10 P.M.
53	DIDCOT	"	2.28 P.M.
77¼	SWINDON (Station)	"	2.54 P.M.
77½	SWINDON (Carriage Works)	*arr*	2.55 P.M.

RETURN JOURNEY.

DISTANCE FROM SWINDON WORKS	STATIONS.		TIMES.
Miles			
—	SWINDON (Locomotive Works)	*dep.*	4.15 P.M.
¼	SWINDON (Station)	*pass*	4.17 P.M.
25	DIDCOT	"	4.42 P.M.
42	READING	"	5.1 P.M.
53¼	MAIDENHEAD	"	5.16 P.M.
78	PADDINGTON	*arr.*	5.45 P.M.

FELIX J. C. POLE,
General Manager

PADDINGTON STATION

خط آهن غربی کبیر

فهرست حرکت موکب همایونی اعلیحضرتین پادشاه و ملکه افغانستان

روز چهارشنبه ۲۱ مارچ ۱۹۲۸

از ایستگاه پادنگتون به سویندون

مسافت از پادنگتون	ایستگاه	حرکت	وقت
میل	پادنگتون		۱-۳۰
¼ ۲۴	میدنهاد	میل	۱-۵۷
۳۶	رایدنیق	"	۲-۱۰
۵۳	دیدکوت	"	۲-۲۸
¼ ۷۷	سویندون	ایستگاه	۲-۵۴
½ ۷۷	سویندون	(فابریک اوتاقهای ترن)	۲-۵۵

فهرست مراجعت

مسافت	ایستگاه	وقت
	سویندون (فابریک و کارتیز بیدی)	۴-۱۵
¾	سویندون	۴-۱۷
۲۵	دیدکوت	۴-۴۲
۴۲	رایدنیق	۵-۱
¾ ۵۳	میدنهاد	۵-۱۶
۷۸	پادنگتون	۵-۴۵

ایستگاه پادنگتون

مدیر کل فیلیکس ج. س. پول

KING OF AFGHANISTAN'S VISIT TO SWINDON WORKS, G.W.R. ON MARCH 21.

Time-table of Royal Train in English and Persian.

Cost of the Train.

THE following statement is an unusual method of indicating how large is the amount of capital which such a train represents (one section only):—

	Dollars.
Electric locomotive, New York to Harmon (33 miles) ..	110,000
Steam locomotive, Harmon to Buffalo (405 miles)	61,500
Steam locomotive, Buffalo to Toledo (288 miles)	61,500
Steam locomotive, Toledo to Chicago (234 miles)	61,500
Mail car	24,000
Club car	50,000
Dining car	50,500
Observation sleeper	50,000
Seven sleeping cars, New York to Chicago	350,000
Two sleeping cars, Boston to Chicago	100,000
	$919,000

In other words, each train, or each section, represents the use of nearly $1,000,000 worth of equipment without counting the services of driver and fireman (changed eight times), conductor, baggageman, and two brakeman (changed three times), Pullman conductor, one maid, one barber, one stenographer, one steward, four cooks, seven waiters, and ten porters.

A Puzzle Picture from New Zealand.

THIS picture, reproduced last month, has not apparently aroused the interest of our readers to any great extent. Mr. J. P. Cummings, of Alloa, Scotland, was the first to write in, suggesting that the peculiar marking was due to "some person carrying an acetylene flare while the lens of the camera was uncovered." "1273 R.O.D." and K. A. Murray also wrote to the same effect. The explanation is that the peculiar markings show how the driver, with his flare lamp, presumably an unusually bright one, passed round the engine and climbed into the cab.

Unofficial Locomotive Nomenclature.

WITH regard to the "Pertinent Paragraph" published under this title in the April number, Mr. E. J. Norris mentions the L.S.W.R. 415 class ("Bulldogs"), Adams small-wheeled 4-4-0's ("Steam-rollers," because of the solid bogie wheels), 443 class 4-6-0's ("Double-Breasters," said

Digitized by Google

to be due to the alleged need for drivers to wear double-breasted coats because of oscillation), small Drummond 4-4-0's ("Greyhounds," because of their speediness down banks), and 0-4-2 tender engines ("Jubilee's" —they first appeared in 1887). On the L. & Y.R. the large 0-8-0's are known as "Sea Pigs." He also mentions "Jinx's Babies," though we believe these were old Stockton and Darlington engines, not the Tennant 2-4-0's, as suggested.

Other readers, including H. Dixon Hewitt, Bernard L. Dawson, "5466 Glendower," and "745 Tintagel," have sent further examples, among which the following may be mentioned :—"Mogul"—originally an American term, and presumably derived from an an engine which bore this name.

Old L.B.S.C.R. 2-4-0's known as "Doves" and a corresponding outside framed 0-6-0, as "Dove Goods," derived from the builder's name, Dübs & Co.; Billinton 4-4-0's known as "Grasshoppers."

S.E.R. "Swallow-Tail" tank engines and "Bulldogs" (0-6-0T used on Folkestone Harbour incline); S.E.R. Cudworth 2-4-0's —"North Kents," and "Ironclads" or "Ironsides"; with 0-4-4T of the same period known as "Gunboats."

L.B.S.C.R. 4-6-4T known as "Fourteen-Wheelers"; 4-4-0's of 1898 as "Brass-backs," due to brass safety valve seatings.

L.C.D.R. 0-4-2T's ("Scotia" class) known as "Scotchmen," and sometimes as "Sandwiches," owing to the limited footplate space and the double spectacle sheets.

L.M.S.R. new 0-6-0T's—"Jinties."

N.L.R. 4-4-0T—"Broad Street Rattlers."

G.C.R. 4-6-2T—"Abbey Tanks."

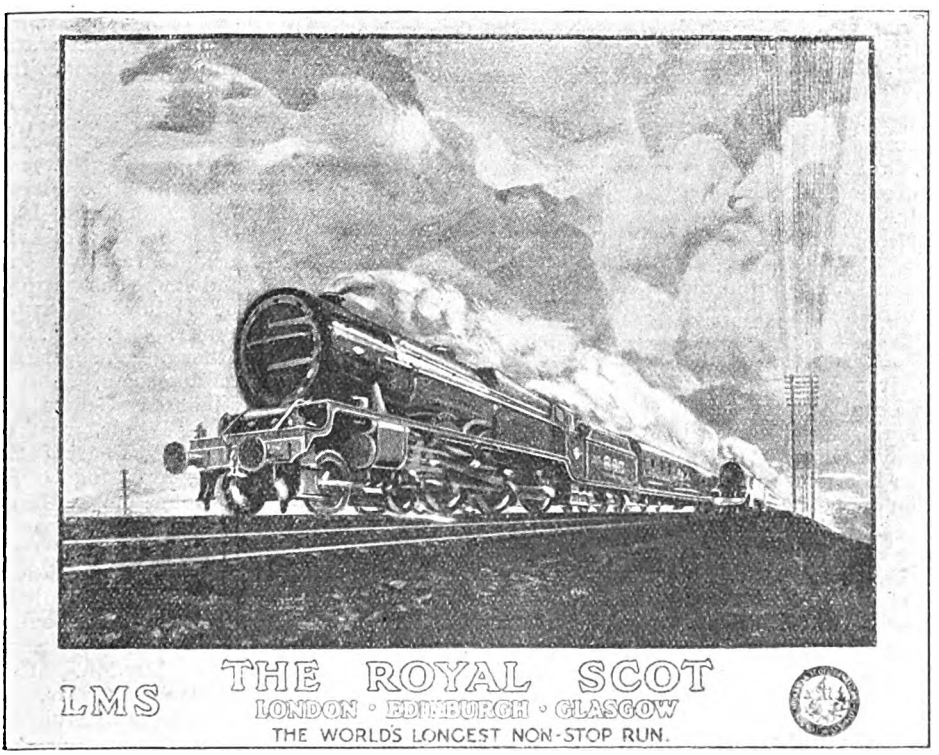
N.E.R. Worsdell 2-4-0's—"Waterburys."

L.S.W.R. 4-4-0's (154 class) as "Large Hoppers," and 329 class as "Small Hoppers;" 0-6-0's (687 class)—"Black Motors;" Adams 4-4-0's—"Flyers." No. 720—"Drummond's Baby"; Inspection engine No. 733, "Pet of the Line"; 0-2-2T's (now 0-4-0T)—"Rockets"; Urie 482 class, "Jumbo 2nd" (Adams 0-6-0's of 629 class were the first "Jumbos)"; Urie 736 class, the "Wonders."

S.R. 2-6-0's built at Woolwich—"Woolworths."

M.R. 4-2-2's—"Spinners."

"ROYAL SCOT" POSTER, L.M.S.R.



Digitized by Google

WHAT THE RAILWAYS ARE DOING.

Mr. M. F. Keogh, General Manager, Great Southern Railways, Ireland, who retires at the end of April, received a presentation at the Irish Railway Clearing House, on behalf of the General Managers' Conference. Amongst those present were :—Messrs. W. Baird, J. Bagwell, D. Barry, G. F. Coulter, J. Cowie, H. Forbes, H. Hunt, S. C. Little, E. W. Mauger, W. F. Minnis, C. A. Moore, E. A. Neale, J. Pepper, W. E. Richardson, and J. B. Stephens. Mr. J. B. Stephens, Chairman of the Conference, General Manager Great Northern Railway, presided, and made the presentation. Messrs. Cowie, Barry, Neale, Baird, Hunt, Minnis, Moore and Pepper also spoke, and Mr. Keogh replied.

* * *

Mr. H. Stewart Coe has been appointed Secretary, Great Southern Railways, Ireland, in succession to Mr. C. E. Riley, the new General Manager.

* * *

We are advised that Sir Francis Dunnell, having expressed his desire to retire at the end of the year from the post of Chief Legal Adviser of the London & North Eastern Railway Company, which he has held since the formation of the company in 1923, the directors have accepted his resignation with great regret, and have appointed Mr. I. Buchanan Pritchard, at present Solicitor to the Metropolitan Railway Company, to succeed him. Mr. Pritchard will take up his duties on January 1 next.

* * *

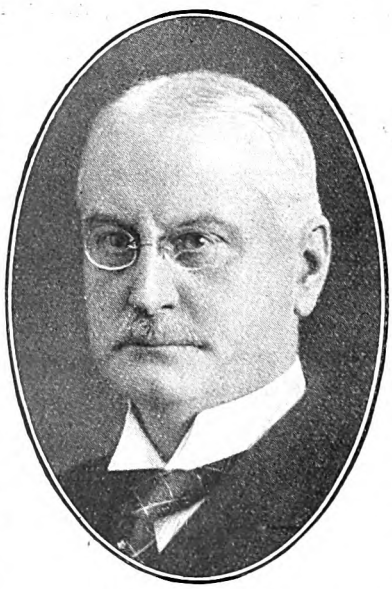
Mr. A. W. Bolden has been elected Chairman of the Antofagasta (Chili) & Bolivia Railway and its associated companies in place of the late Lord Lawrence of Kingsgate.

* * *

Members of the Mechanical Warfare Board, which has been set up by the War Office, include Sir Henry Fowler, K.B.E., LL.D., Chief Mechanical Engineer, L.M.S.R. (Institution of Mechanical Engineers), while Associate Members of the Board include Mr. G. J. Shave (London General Omnibus Company).

* * *

The appointment of Mr. Wm. Baird to the position of Steamship Passenger Traffic Manager in Montreal, C.P.R., has naturally necessitated a number of changes in the Passenger Department in Europe. Mr. H. C. Dring, European Passenger Manager, announces that, effective from March 1 last, Sir George McLaren Brown, European General Manager, Canadian Pacific Railway, has approved the following appointments :—Mr. R. E. Swain, hitherto Passenger Agent at Liverpool, has been appointed General Passenger Agent, with office at 62–65, Charing Cross, S.W., reporting to European Passenger Manager. Mr. H. T. Penny has been appointed Passenger Agent at Liverpool, in succession to Mr. Swain. Mr. A. L. Rawlinson, hitherto Passenger Agent at Antwerp, has been promoted to the Continental Passenger Section, 62–65, Charing Cross, London. He has been succeeded at Antwerp by Mr. E. A. Schmitz, hitherto the Canadian Pacific Agent at Prague, who has, in turn, been succeeded by Mr. W. Alder.



MR. T. ELLIOTT,
Who retires on April 30 from the position of Commercial Manager, Great Southern Railways, Ireland.

Digitized by Google

THE L.N.E.R. announces that Mr. A. C. Howes, Manager of the Great Northern Station Hotel, King's Cross, has been appointed Manager of the Royal Victoria Station Hotel, Sheffield. Mr. H. H. Wood, Manager of the Sandringham Hotel, Hunstanton, succeeds Mr. Howes at the Great Northern Station Hotel, King's Cross, and Mr. J. Linton, District Manager, Hotels Department, Cambridge, succeeds Mr. Wood as Manager of the Sandringham Hotel, Hunstanton.

* * *

WE are officially informed that the directors of the London & North Eastern Railway have made the following appointments:—

Mr. H. S. Davies, Chief Assistant, District Engineer's Office, King's Cross, to be District Engineer, Leeds, in succession to Mr. T. H. Seaton.

Mr. O. H. Corble, Chief General Manager's Office, King's Cross, to be Assistant District Goods Manager, Newcastle-on-Tyne, in succession to Mr. K. P. Walker.

Mr. H. Arnott, Superintendent's Office, Edinburgh, to be Assistant to the Superintendent, Southern Scottish Area, in succession to Mr. W. Lyle.

* * *

MR. J. PURVES, who has been appointed Divisional Carriage and Wagon Superintendent, Wolverton, L.M.S.R., has held the position of Chief Outdoor Assistant to the Carriage and Wagon Superintendent since March, 1923. He commenced his career with R. & W. Stephenson & Co. Ltd., of Newcastle-on-Tyne, and finished his apprenticeship at the old North Road Works of the North Eastern Railway at Darlington. Subsequently he was transferred to the Carriage and Wagon Department at York, and in due course became an Inspector of Materials. Later, he entered the service of the Midland Railway, and was appointed Outdoor Assistant to the Carriage and Wagon Superintendent.

* * *

MR. E. G. OLIVER, who has been appointed Chief Outdoor Assistant, Derby, Carriage and Wagon Department, L.M.S.R., served an apprenticeship in the fitting and turning shops and drawing office of the old L. & N.W.R. at Wolverton. During this time he studied at the Wolverton Science and Art Institute, and the Royal College of Science, South Kensington, obtained a Whitworth Exhibition, and qualified to teach various engineering and technical subjects, and taught those subjects at Wolverton for many years. He was then employed on the out-station staff for five or six years, and eventually returned to the drawing office to become Chief Draughtsman, and on the retirement of the late Colonel H. M. Williams,

MR. J. PURVES,
Appointed Divisional Carriage and Wagon Superintendent, Wolverton, L.M.S.R.

MR. E. G. OLIVER,
Appointed Chief Outdoor Assistant, Derby, Carriage and Wagon Department, L.M.S.R.

Digitized by Google

as Outdoor Assistant for the Carriage Department of the old L. & N.W.R., he was appointed to that position. When the grouping of railways came about and Mr. Purves became the Chief Outdoor Assistant for the L.M.S.R., Mr. Oliver became the Outdoor Assistant for the Southern Area, and on Mr. Purves relinquishing the former position, Mr. Oliver has been appointed Chief Outdoor Assistant, with headquarters at Derby, as above mentioned.

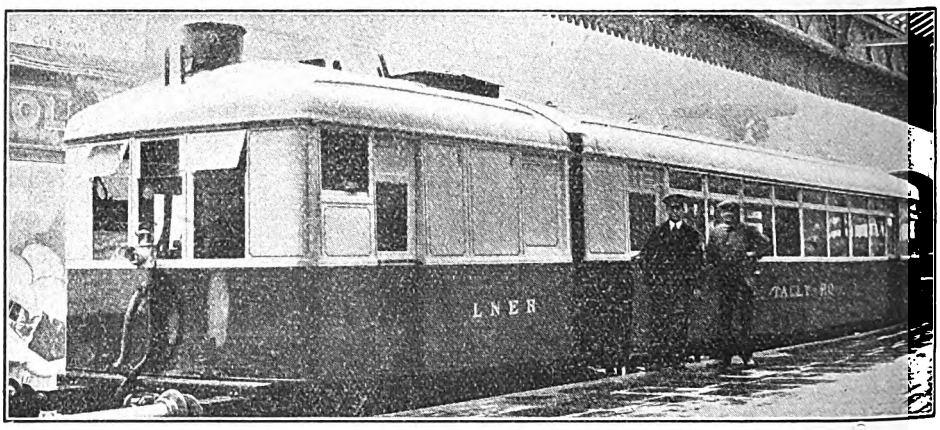
* * *

THE Gothard-Pullman Express train-de-luxe, composed exclusively of the latest type of first- and second-class Pullman cars (each provided with kitchen as in the "Golden Arrow" express) is now running daily between Bale and Milan in both directions. On the outward journey it leaves Bale at 7.12 a.m. in connection with the 2 p.m., 4 p.m. and other boat trains from Victoria, arriving at Milan at 1.50 p.m. in connection with the direct expresses to Florence, Rome, Venice, Brindisi, &c. On the return journey the Gothard express leaves Milan at 4.10 p.m., arriving Bale at 10.44 p.m. in connection with the night services for Paris and London.

* * *

A KEENLY-appreciative audience assembled in the Queen's Hall recently, for the annual concert of the L.N.E.R. Musical Society, given by the orchestra of 100 performers and the male-voice choir of 300 of the Society, this being the 145th concert and the conclusion of the twentieth season. Mr. William Whitelaw, Chairman of the company, occupied the chair. The conductors were Mr. H. A. Bennett, F.R.C.O., of the Doncaster Section, and Mr. E. R. Wilby, while the soloists were Miss Noel Eadie and Mr. Frank Titterton. Mr. Sydney Harrington, F.R.C.O., gave an introductory organ recital, also during the concert serving as accompanist. A distinctly interesting programme, including orchestral, choral, combined orchestral and choral, solo and community singing items, was most effectively rendered.

Shortly after the interval, Mr. C. J. Selway, Passenger Manager, Southern Area, L.N.E.R., expressed the Society's welcome to Mr. Whitelaw as chairman. Mr. Whitelaw, rising to reply, was greeted with full musical honours. The choir and orchestra had lost none of their brilliance, but he thought that it should not be the privilege of London only to hear them, and he hoped that in the next season other centres, mentioning Norwich in particular, should be similarly favoured. Referring to the secretarial services rendered by Mr. A. W. Headley during the past 20 years, he had heard it suggested that that gentleman was getting old, and might soon retire. He would, however, sentence him to several years' further service. As long as he was Chairman of the company they could be assured of his full appreciation and practical support and sympathy.



L.N.E.R. SENTINEL-CAMMELL RAIL-COACH, "TALLY-HO."

* * *

THE Underground Railways have placed the following contracts, all British, for equipment :—

For the District Railway, 101 car bodies, 184 bogies, 538 traction motors, and 263 control equipments.

For the Hampstead & City lines, 112 new cars, 224 bogies, 128 traction motors, 127 control equipments, and 170 car bodies.

For the Bakerloo line, 162 new cars, 116

Digitized by Google

traction motors, and 57 control equipments.

A further 136 car bodies, 612 bogies, and 266 traction motors have been ordered for the Hampstead & City and Piccadilly lines, and 67 control equipments for the latter railway.

With the exception of the 112 new cars for the Hampstead line, the whole of the new rolling-stock will replace old cars now in service. It is hoped to have a large proportion of the new equipment in service by the end of the year and the remainder early in 1929.

* * *

WHAT is believed to be the longest day excursion ever run carried a party of 350 football enthusiasts from Inverness to London on March 31 for the International Football Match at Wembley, and took them home again afterwards. The total distance covered is 1,136 miles, and the fare 30s.—over three miles for a penny.

* * *

As an experiment, a programme of light orchestral music will, until further notice, be rendered during dinner in the saloon of the L.N.E.R. s.s. *Bruges*, whilst that vessel is steaming down the River Scheldt on the journey from Antwerp to Harwich. The apparatus installed is manufactured by the Gramophone Company, and represents the latest application of electrical science to the gramophone. Only the s.s. *Bruges* is at present equipped, but the Company has under consideration the fitting of similar apparatus to other vessels if the innovation meets a real public need.

* * *

THE Minister of Transport gives notice that he has approved and proposes to make and issue to the Great Western Railway (Minera Branch) Order, 1928 authorising the G.W.R. to make the railway and to acquire the lands referred to in the Order in the Rural District of Wrexham, in the County of Denbigh.

* * *

THE geared turbine steamer *Duke of Rothesay*, the last of three which William Denny & Bros. Ltd., Dumbarton, have built for the London Midland & Scottish Railway, was launched recently, this being the hundredth turbine steamer built by the firm. Sir Thomas Royden, Bart., Director of the L.M.S.R., Mr. R. W. Reid, Vice-President, L.M.S.R., and Mrs. Reid, who named and launched the vessel, were present at a luncheon following the launch.

* * *

A CONTRACT has been placed by the L.N.E.R. with J. Brown & Co., Clydebank, Glasgow, for a twin-screw geared turbine passenger steamer for the Harwich-Hook of Holland service. The design of the new steamer will be based upon the steamers now running in the Hook of Holland and Antwerp services, but embodying many improvements. Comfortable sleeping accommodation is to be provided for over 500 passengers on four decks. Bathrooms will be installed in the first-class accommodation. When completed the vessel will be the largest steamer in service on Continental routes.

* * *

THE Underground Company has decided to simplify still further the system of obtaining season tickets on their railways. On and from July 1 next all season tickets will be issued from the station booking offices just like ordinary tickets, and it will no longer be necessary for the passenger to call at the season-ticket offices at Mansion House or Oxford Circus stations, or await tickets at their home stations sent from these offices. The past few months has seen a remarkable increase in the number of "seasons" issued. The number issued in August was 61,196, and in December the number had grown to over 90,000.

* * *

ON March 9 a lecture was given by Mr. Cecil J. Allen, M.Inst.T., to the "First Hundred" boys at Eton College. Dr. C. A. Alington, the Headmaster of Eton, in introducing the lecturer to an audience of about 250, stated that he believed he had still the power, under an old statute, to compel the Great Western Railway to erect a high fence alongside their main line past Slough, in order that the boys of Eton College might not be distracted in their studies. Mr. Allen, with the aid of lantern slides, explained the considerations which underlie the planning of railways, and the relation between the location of lines and the physical features of the country that they traverse, drawing his illustrations from the railways of both Great Britain and Continental countries, and was followed with close attention during the course of an hour's talk.

* * *

THERE was a well-attended meeting of the Railway Students' Association, London School of Economics, on March 22, when Mr. W. M. Teasdale, Assistant General Manager (Parliamentary) and Industrial Agent, L.N.E.R., read a paper on "Selling Transport." Mr. W. Valentine Ball occupied the chair.

* * *

TWENTY licensed premises belonging to the L.M.S. were offered for auction at the Midland Hotel, Manchester, on March 20,

Digitized by Google

probably the largest auction of the kind ever held.

* * *

MR. A. M. BUSHELL directs our attention to the following item, relating to the old Surrey Iron Railway, which recently appeared in the *Balham, Tooting and Mitcham News and Mercury* :—

Discovered during the excavations for St. Mary's Church Hall, Summerstown, a relic of the old iron railway—one of the first to be erected in England—which used to run from Wandsworth to Merton, has been inscribed and placed in an important position in the church.

* * *

AT a meeting of the Railway Club, held on March 19, Mr. W. A. Willox read a paper entitled "A Railway Journey in Spain," describing his experiences when following the route of the "Sud Express" from Paris to Madrid, returning to the French frontier *via* Zaragossa, Barcelona, and the eastern end of the Pyrenees. The paper was illustrated by an excellent series of lantern slides.

* * *

THE Wagons-Lits Company have placed an order for eight first-class sleeping cars and six Pullman cars for their Egyptian services with the Metropolitan Carriage, Wagon & Finance Co. Ltd.

* * *

ONE of our oldest readers and a frequent correspondent, Mr. E. A. Gurney-Smith, has written to the *District Times* (Bromley, Kent, and neighbourhood) suggesting that the volume of traffic now dealt with at Bromley South station, Southern Railway, amplified by a large amount of interchange between suburban and main-line trains, calls for widening of the platforms and certain other desirable improvements. We understand that the matter is under consideration.

* * *

HATTERSLEY Tunnel at Mottram, in the Manchester district of the L.N.E.R., is in process of being opened out.

* * *

A NEW goods station close to the passenger station at Newport, Mon., was opened by the Mayor of Newport on March 8.

* * *

MR. J. C. H. BRASH writes :—"On the night of Sunday, March 25, and the morning of Monday, March 26, the brick bridge which carried the main line of the G.W.R. at Widney Manor, 8 miles south of Birmingham, was replaced by a steel girder bridge, so that the "King" class of engines may use this section of the line. At 5 p.m. the up line was pulled up, and with the aid of a steam crane the timber baulks which had been placed in position about three months previously were removed; all the earth remaining on the old brick arch was cleared, a certain part of which was also pulled down. At about 10.45 the new bridge, which had been built on scaffolding alongside, was hauled half-way across by means of winches. Shortly after 11 p.m., the down line was pulled up (all traffic having been suspended), and the same procedure was carried out. When this was finished the bridge was pulled into its final position and was raised with hydraulic jacks so that the bogies and the rails upon which it had rested could be removed. It was now lowered into its final position and the rails quickly restored; the up line being opened at 6.30 a.m. and the down at 8.30 a.m."

* * *

WIMBLEDON MODEL RAILWAY CLUB arrangements for May are :—May 7, Test Track and Monthly Competitions. May 21, a lecture, "Is Radio of any Use to Railways?" This question will be discussed by members of the Wimbledon Radio Society, and should prove of great interest. Both these meetings will he held at the Red Cross Hall, Church Road, Wimbledon. May 26, visit to Stratford Locomotive Running Sheds, L.N.E.R. For meeting-place and time, communicate with the Hon. Secretary.

* * *

THE L.N.E.R. announces that the pier at New Holland has been reconstructed, and is now open for traffic. This pier serves the principal ferry connecting the north and south sides of the Humber.

* * *

A DINNER was held under the auspices of the Governing Body of the Railway Convalescent Homes at the Wharncliffe Rooms, Hotel Great Central, Marylebone, N.W.1, on March 28. Brig.-General the Hon. Everard Baring, C.V.O., C.B.E., Chairman, Southern Railway Company, was in the chair.

* * *

WE regret to record the death, at Torquay, of Mr. R. J. S. Insell, Signal and Telegraph Engineer, Great Western Railway.

* * *

MR. WILLIAM LYLE, Indoor Assistant to the Superintendent, Edinburgh, L.N.E.R., has been appointed District Operating

Digitized by Google

Superintendent, Burntisland, *vice* Mr. D. McRobbie, deceased.

* * *

WE regret to record the death, on March 20, at the age of 76 years, of Mr. George H. Eyre, who retired in 1920 from the position of Traffic Superintendent of the Somerset and Dorset Joint Railway.

* * *

THE strengthening of the skew underbridge west of Bath station, on the G.W.R., to enable locomotives of the "King" class to run over this section is now proceeding on Sundays. Special electric lamps have been temporarily installed to assist the progress of the work. Single-line working is conducted meanwhile. It is expected that the "King" class of locomotives will work through Bath on the inauguration of the summer services in July.

* * *

ON March 5 the Great Southern Railways (Ireland) introduced an improved and accelerated service on the Dublin and South Eastern section. Mr. K. A. Murray explains that the old stations of Sandymount and Merrion have been reopened as "halts," and are served by short stopping trains (engine and two vehicles) between Dublin and Kingstown at frequent intervals. Trains to Dalkey run fast to Blackrock, serving all stations beyond, while Bray and Killiney trains run non-stop to Dun Laoghaire, these two places now having a half-hourly service. Dun Laoghaire is now served by 94 down and 96 up trains, 25 down and 17 up being expresses, while several others do not stop between Blackrock and Dublin. Sandycove, Glenageary and Dalkey have 62 down and 63 up trains, mostly fast. Reductions in season-ticket rates have been made, and already appear to be very popular. Only a few six-wheeled cars are now running on the section, the bogie stock, some of which is entirely new, contributing much to the comfort of the passengers.

* * *

THE Canadian National Railways have opened a new office in Birmingham at 326, Broad Street. The new office will be in charge of Mr. J. A. Cross, formerly travelling freight agent associated with the Manchester office of the company.

* * *

EXAMPLES of colour-printing for the great railway and shipping companies, including some famous Great Western Railway posters and the latest shipping poster, showing deck tennis on the P. & O. liner *Ranchi*, were exhibited in the British Industries Fair, White City, February 20 to March 2, by Mr. Philip Reid, a pioneer in pictorial printing for the encouragement of travel.

* * *

IN view of the growing popularity of seat reservation, as to which 136,000 reservations were made in 1927, arrangements have been made by the L.N.E.R. for the selection by passengers of dinner seats (also the reservation of accommodation in restaurant cars) from printed seat plans applying to the expresses between London and Edinburgh and Glasgow by the East Coast route. Staff in uniform, distinguished by the words "Reserved Seats," will be in attendance for the guidance of passengers who have booked seats.

* * *

THE Canadian farmers who recently toured this country as the guests of the Canadian National Railways visited the Ministry of Labour's farm training centre, Brandon, Norfolk, by L.N.E.R. special train from King's Cross station. On the return journey the L.N.E.R., by co-operation with Wren's Boot Polish Company, provided four shoeblacks in uniform, complete with chairs and foot rests to clean the boots and shoes of the party. The shoeblacks were accommodated with pitches in the front and rear vans of the special train. This is the first time that organised shoe cleaning has been arranged on a train in this country.

* * *

IN the designs for new restaurant cars for the main-line services between King's Cross and Aberdeen, an additional 3 in. has been gained by inletting the outside door handles of the carriages into the framework of the coaches. The present cars are 9 ft. 3 in. wide, but as the handles protrude 1½ in., the enlarged cars will be 9 ft. 6 in. wide.

* * *

MEMBERS of the Wimbledon Model Railway Club spent an enjoyable evening recently at the Underground Company's South Kensington Signal School. The school is equipped with a small electric signal cabin, and various types of automatic and semi-automatic signalling apparatus, besides examples of various types of train stops, point mechanisms, &c. Opportunity was given the visitors of working the electric frame, and all the apparatus was fully demonstrated.

* * *

SIR W. G. ARMSTRONG, WHITWORTH & CO. LTD. have secured a contract from the

Digitized by Google

Southern Railway Company for the construction of 14 six-wheeled tenders. The work will be carried out at the Scotswood Works, Newcastle-upon-Tyne.

* * *

WE are advised that the ten 4-6-0 locomotives on order with the North British Locomotive Co. Ltd., for use on the Great Eastern section of the L.N.E.R., will have three cylinders and piston valves.

* * *

MR. L. B. HEWITT writes :—" No 6007 is, at the time of writing, one of the latest of the 'King' class of Great Western locomotives to leave the shops. No. 3219, of the 4-4-0 type, which forms one of the illustrations to Mr. F. W. Brewer's article in the RAILWAY MAGAZINE for March, has just been turned out after repairs painted a bluish shade of black. The finish is lustrous, and the appearance is not unpleasing. This procedure does not imply a precedent. Further locomotives of the batch of 20 'Kings' are at present under construction.

"Evidently the six-coupled locomotive will be practically ubiquitous on the Great Western Railway in the near future. When the first 'conducted trip' from the West of England to Swindon works was run on November 16 of last year, a batch of 'light' tank engines of the 2-6-2 type had been just completed.

"Visitors from the West on the second trip of the series, on March 1, found that the last additions to the numerous class of 2-6-0 mixed traffic locomotives—the 8300 class—were to be seen in many of the sidings adjoining the works.

* * *

A RECORD number of 190 trains now pass through the three "Underground" stations at Charing Cross during each rush hour. On no other railway in this country do so many trains pass a given point in the hour. Oxford Circus station (Bakerloo & Piccadilly) comes next, with 108 trains an hour, and Piccadilly Circus is third, with 100 in the hour. The District Railway holds the record for the number of trains operating hourly on any one section of track. No fewer than 80 trains an hour run between Mansion House and Sloane Square during heavy traffic. 1,583 cars are employed for rush-hour traffic on the "Underground," and they provide seating accommodation for 71,250 passengers.

* * *

ON January 25, a special train on the Big Four, consisting of a locomotive, one coach, and two official cars, made what is believed to be the second fastest long-distance run on record, when it ran the 536·1 miles from St. Louis to Cleveland in 509 mins. at an average speed for the entire distance of 63·2 m.p.h. Existing records indicate that this performance has been exceeded on only one previous occasion, when, in 1905, on the old Lake Shore & Michigan Southern from Buffalo to Chicago, a special train made a record of an average speed of 69·69 m.p.h.

* * *

A LARGE increase in the number of L.M.S.R. employees interested in ambulance work is evidenced from the yearly report for 1927. The total number of employees who have passed examinations is 9,437, and this is an increase of 2,244 over 1926. 1,372 employees in England and Wales, and 506 in Scotland, qualified to receive gold medals for 15 consecutive years' attendance at classes. The Order of St. John has been conferred on 24 members of the L.M.S.R. staff, while six have been awarded a vellum vote of thanks.

* * *

THE L.N.E.R. announce that a competition for prizes to be given by the directors for the best-kept stations throughout their system will be held in 1928 on similar lines to last year. An inspection will be held in July and August, and money prizes and certificates will be awarded. In making the awards the judges will take into consideration the situation of the station and the space available for flower and shrub displays, apart from the general condition and cleanliness of the station premises. Over 300 prizes were awarded in last year's contest.

* * *

THE L.N.E.R. is setting up a new rotary carriage-washing plant at York. The installation, which is operated electrically, consists of a series of vertical drums or brushes so fitted on both sides of the track that they will rotate at high speeds and thoroughly wash and cleanse trains of carriages as they are shunted through the plant. A similar apparatus is in use on the Nord Railway of France.

* * *

PARTICULARS have been issued to the staff of the Southern Railway by the Central Garden Plots Committee of the District Team Competition for 1928 and of the third annual potato competition. Prizes in the team competition have been increased, while additional classes have been added in the potato competition. The exhibition will be held on October 3. Further par-

Digitized by Google

ticulars can be had from Mr. F. Gilbert (General Manager's Office, Waterloo Station), Hon. Secretary to the Central Garden Plots Committee.

* * *

MR. THEODORE G. HERON writes: "At the Grindleford end of Totley Tunnel, on the Midland Section of the L.M.S., I recently observed two distant signals on one low post, one immediately above the other. What is the reason for the two? This is the 'down' inner distant controlled by the Grindleford cabin, there being also intermediate and outer 'distants' (ground signals) in the tunnel owing to its exceptional length."

* * *

PARTICULARS are now available of a notable run made last year to convey from Washington to New York films of the reception given to Colonel Lindbergh in honour of his great flight across the Atlantic. The run from Washington to New York, a distance of 224–6 miles, including two stops, was made in 187 min., or at the rate of 72 m.p.h. Excluding the two stops, the rate was 74·9 m.p.h. From Washington to Manhattan Transfer, where change was made from steam to electric traction, 216 miles, including one stop, were covered in 175 min., 74 m.p.h. Excluding the stop, the rate was 75·78 m.p.h. The section between Washington and Fulton Junction, 38·1 miles, was covered in 28½ min., or at the rate of 80·2 m.p.h. Between North Point and West Yard, 61·16 miles, the time was 46 min., 79·8 m.p.h. The section between Wilmington and Brill, 23·3 miles, was covered in 17·5 min., 79·8 m.p.h. Between Holmesburg Junction and South Street, Newark, 66·6 miles, was covered in 47 min., 85 m.p.h. The train consisted of two cars and was worked by a 4-4-2 locomotive.

* * *

LIEUT.-COLONEL A. H. L. MOUNT'S report to the Ministry of Transport on the head-on collision which occurred on October 31, at Ware, L.N.E.R., has been issued. At this station, on the Hertford branch, the location is peculiar, in that the station platform is served by a short section of single line. An up train from Hertford to Liverpool Street, drawn by 2-4-2T locomotive No. 7182, was leaving the station for Liverpool Street when it was run into by a down train from Liverpool Street to Hertford, worked by 0-6-2T No. 829. The four enginemen were injured, two seriously, and the two guards and 21 passengers sustained minor injuries or shock. Drifting fog prevailed, but fogmen had not been called out. The report discusses instructions applicable to traffic working at this point and certain operating methods in force. The driver of the down train is blamed to some extent, as are also certain other people concerned. Principal criticism applies, however, to the manner in which instructions as to the use of the "warning" arrangements were applied. The inspecting officer advises that the instructions should be revised as a whole, and that if the line cannot be doubled at this point the signalling should be revised.

* * *

LIEUT.-COLONEL A. H. L. MOUNT'S report to the Ministry of Transport on the collision which occurred on December 7 at Peterborough North station, L.N.E.R., has been issued. An L.M.S.R. train from Leicester to Peterborough East, drawn by 4-4-0 No. 540, had started to move away from the up main platform when it was run into in the rear by L.N.E.R. 4-6-0 No. 5034, drawing a special excursion train from Gainsborough to King's Cross. A certain amount of damage was done and one passenger in the rear vehicle of the L.M.S.R. train died subsequently. The accident occurred under fog conditions. Principal responsibility is placed upon the driver of the special train, in that he failed to observe the danger indications of certain signals and failed to hear detonator explosions. It is suggested, further, that he was travelling rather faster than was safe in the circumstances.

* * *

THE Westinghouse Brake and Saxby Signal Co. Ltd. have received a further order from the Crown Agents for the Colonies for double-wire signalling apparatus for 13 roadside stations, Tororo-Soroti branch line, Kenya and Uganda Railway. This brings the number of stations on this line so equipped up to 59.

* * *

IN order to facilitate the movement of freight traffic through the marshalling yard at Starbeck, the L.N.E.R. announces that it is proposed to lay down six additional traffic sidings. The provision of these sidings will enable wagons to be dealt with more expeditiously in the yard.

* * *

SIXTY-THOUSAND pounds is being spent by the L.M.S.R. to improve and extend the Turnberry (Ayrshire) Hotel. The alterations include new hard tennis courts, a miniature golf course, 60 more bedrooms, and an artificially-heated salt-water swimming pool,

Digitized by Google

which will make bathing possible all the year round.

* * *

A READER asks for the numbers of the L.N.E.R. 2-2-4T engines used for working inspection saloons other than 668 and 1679.

* * *

As from the beginning of the present financial year, October 1, 1927, the system previously known as the Beira & Mashonaland and Rhodesian Railways is to be known by the more convenient title of the Rhodesia Railways. These railways are owned by six different companies and serve five territories.

* * *

AN additional L.N.E.R. service of motor omnibuses has been instituted between Aberdeen and Inverurie, *via* Bucksburn, Chapel, Blackburn, Kinellar and Kintore, On week-days there are eight services each way, with two additional ones on Wednesdays and Saturdays. There is also a Sunday service consisting of six journeys in each direction.

* * *

ON December 20, Sir Malcolm Hailey, Governor of the Punjab, officially opened a further 32 miles of railway in the Gurdaspur district. This is a branch leaving the Amritsar-Narowal line at Jassar, and running northward some 26 miles to Chak Amru, close to the border of Jammu State. The first section, from Narowal to Jassar, is 6 miles in length. The railway passes through a thickly-populated and well-cultivated area. It is expected, in addition, to open up considerable trade with Jammu State.

* * *

FOR the convenience of invalids travelling long distances abroad, the Paris, Lyons and Mediterranean Railway will shortly introduce "Wagons-Ambulances," constructed to give the maximum amount of comfort under modern hygienic conditions, and enable the journey to be made in a bed free from the ordinary jolts and jars often associated with a railway journey. There is accommodation for nine persons in addition to the invalid, and provision for cooking by electricity and the use of hot as well as cold water.

* * *

IN co-operation with the German Railways, the L.N.E.R. will introduce a new route to Switzerland *via* Harwich and the Hook of Holland, as from May 15. A new car, after the style of the English Pullmans, will be used by the German railways, and a daylight service provided to Switzerland and Italy *via* the Rhine Valley and the Black Forest.

THE L.N.E.R. has standardised 170 items of signal-fitting equipment for use throughout the 7,000 miles of their line.

* * *

THE L.N.E.R. announces that Mr. F. L. Triffitt, Assistant District Engineer for Docks, Hull, has been appointed District Engineer for Docks, Hull.

* * *

SIR JOSIAH STAMP, G.B.E., Chairman of the London Midland and Scottish Railway Company, has been nominated to fill the vacancy on the Bank of England directorate caused by the retirement of Sir Henry Cosmo O. Bonsor, Bt.

* * *

WE regret to record the death of Mr. William Willox, M.A., M.Inst.C.E., Chief Engineer of the Metropolitan Railway from 1906 to 1921. Following his retirement in the latter year, his services were retained in a consultative capacity.

* * *

MR. A. P. HERBERT, of 61, Percival Street, Leeds Road, Bradford, would be pleased to hear from readers interested in Midland Section locomotives and services in his district.

* * *

BETWEEN 6 and 7 p.m. daily 22,600 persons pass through the Gare de l'Est, Paris, which station is at present undergoing an extensive plan of reconstruction. The number of passengers using the station in 1925 was 25,000,000.

* * *

As from February 1, the Simplon-Orient Express provides a passenger service from Paris to Cairo. The section between Tripoli and Haifa is covered by motor car, pending the completion of the railway.

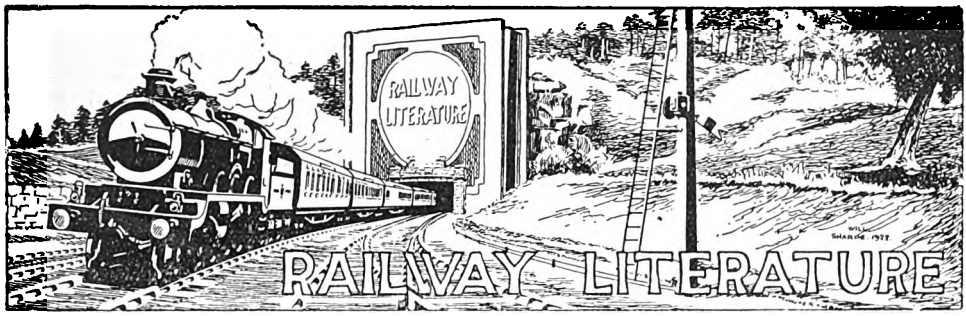
* * *

MR. G. T. MOODY points out that the particulars given of the head codes used by electric trains on the Southern Railway require the addition of the letters "SL," which indicate South London trains between London Bridge and Victoria.

* * *

AT the meeting of the Railway Club held at 25 Tothill Street, S.W.1, on April 16, a paper was read by Mr. B. M. Bayley on South American Railways. The paper took the form of a general survey of the continent and contained a mass of interesting information which was much appreciated by the members present. At the conclusion a number of lantern slides were shown, kindly lent by Mr. Charles Travis Associate Editor of *The Railway Gazette*. The author expressed his indebtedness to Mr. Travis and a number of South American railways for help given in the compilation of his paper.

Digitized by Google



THE RAILWAY YEAR BOOK, 1928. [Railway Publishing Co. Ltd., 33, Tothill Street, London, S.W.1. Price 5s. net; by post 5s. 6d.]

IN introducing the 31st Annual Edition of THE RAILWAY YEAR BOOK, ready in a few days, the Editor directs attention to the fact that the wide range of information which it supplies, largely unobtainable from any other source, except at the expense of extensive research, is the subject of very close revision each year. Further, the statistical information given is usually much more up to date than that available elsewhere, or is presented in a form particularly convenient for reference purposes. Thus, besides statistical particulars in regard to the home railways as at the end of 1927, that is, nearly up to the date of publication, official particulars and other information cover practically every change or other development, which can be included before final closing for press.

But while emphasising this aspect, in regard to which THE RAILWAY YEAR BOOK is unique in its own field, a number of detail improvements have been incorporated in the new edition, while certain sections have been developed. Particulars of the National and Central Railway Wages Boards and of the National Councils have been amplified by corresponding information in regard to the railway police forces, railway shopmen and staff employed at railway electricity generating stations and substations. Each section includes the names of representatives on the respective Councils and the bodies they represent, with dates of the principal agreements and decisions. Several additions have also been made to the numerous societies and institutions of railway interest of which particulars appear.

Articles devoted to the home railways have been extensively revised and additional information given. Special developments in regard to train services; long non-stop runs; high-speed schedules; restaurant and Pullman car, sleeping car and slip-coach facilities; electrification; steamships, &c., are all duly chronicled in convenient form. The train service and train running tables are particularly of interest owing to the fact that there have been important and notable developments in this connection. In the case of smaller independent railways, information is now given of the Romney, Hythe and Dymchurch and Ashover Light Railways, as also of the Light Railway projects for which orders have been issued.

In the foreign section special attention may be directed, first, to the new and very informative railway map of Africa, and to the fact that the African Section as a whole has been developed to give particulars of all railways in this continent, in regard to which adequate railway information has, in the past, been noticeably lacking.

The detailed "Index," introduced two years ago and the list of "Principal Contents" are retained, while the "Who's Who" Section includes a number of new biographies, as well as covering the numerous official changes which have occurred since the 1927 edition was published.

COLOMBIA—THE COUNTRY TO WATCH. By Norman Thomson, Secretary to the Anglo-Colombian Chamber of Commerce. [Published by the Anglo-Colombian Chamber of Commerce, 7, Sicilian Avenue, Southampton Row, London, W.C.1. Price 1s.]

This pamphlet, with a large-scale folded map, contains a great deal of useful statistical and other information concerning the comparatively little-known Republic of Colombia. Following a general survey, particulars are given of seaports and railway connections, the railways, and other information which should be very useful for reference and other purposes. Separate articles are included describing those railways which are operated by British companies. An interesting section is that on aerial ropeways.

HOLIDAYS BY L.M.S.—This is the title of a weighty volume of over 600 pages issued by the London Midland & Scottish Railway. Published at sixpence, it forms a veritable text-book for the prospective

Digitized by Google

holiday-maker, seeing that within its attractive cover no fewer than 700 different resorts are succinctly described, 200 of them being finely illustrated. In addition, it contains a list of 7,000 hotels, boarding houses, &c., together with folding map relating to North Wales, the English lakes, the Lancashire coast and the Isle of Man. The various camping sites adjacent to the company's system are also enumerated. We understand that 50,000 copies of the guide book have been printed.

THE 1928 edition of "Hints for Holidays," the well-known Southern Railway guide and hotel and apartment list, will, no doubt, be appreciated by large numbers of our readers, in that it is well worth the price of sixpence, even if one does not desire it for referring to hotel, boarding-house and apartment information. The cover, which bears the figure of a herald, described as "The Sunshine Herald," gives a good indication of the contents. As usual, the work is divided into county or area sections, each complete in itself, with a map, guide book descriptions, numerous photographic reproductions and lists of hotels, boarding houses, apartments, &c. It is well produced and liberally illustrated.

THE American Express Company sends from its Liverpool address, 31, James Street, a copy of the "American Tourists' Handbook: United States and Canada," recently issued in conjunction with the New York Central Railroad. This is a well-produced booklet, with a number of interesting illustrations, scenic and railway (some in colour), with notes likely to appeal to the prospective tourist. Information is also given as to arrangements for checking baggage, with a table of railway and sleeping-car fares from New York to various centres in the United States. Included is a large folding map.

SEEING GREAT BRITAIN BY RAILWAY.—A 72-page booklet has been issued by the Railways Information Bureau, 35, Parliament Street, S.W.1. It gives many interesting details of 200 round tours at reduced fares "in England, Wales, Scotland and Ireland by the famous British railways." Primarily the booklet is published for the information of American and overseas visitors, but applies equally to British tourists. The tours, which are available from May 1 to October 31, 1928 (except where otherwise shown), are available in many cases over two or three railway systems, and cover popular resorts associated with the names of Shakespeare, Scott and Dickens, and other worthies. The cost of the round tour tickets has been shown under each tour in approximate American dollar value at par, as well as in British sterling. A folding map of Great Britain and Ireland is included.

COUNTRY HOMES AT LONDON'S DOOR.—This very attractive booklet has been issued by the Southern Railway, and is one of the most complete publications of its kind ever issued in this country. Provided with a cleverly-designed pictorial cover, in colour, it contains 376 pages, 255 photographs of houses and estates, and gives the fullest information about 109 towns and districts in Kent, Surrey and Middlesex—areas which are being developed and served by the electrified lines of the Southern Railway system. Two districts that are of particular interest are those south of Purley along the lines to Caterham and Tattenham Corner, now electrically operated. Every conceivable detail that house hunters, young or old, could want is included in the book, copies of which can be obtained gratis at any Southern Railway Inquiry Office, or post free from the Indoor Commercial Manager, London Bridge Station, S.E.1.

SOUTHERN RAILWAY HOLIDAY ARRANGEMENTS.—An eight-page folder issued by the Southern Railway deals interestingly with the annual-holiday problem, and shows at a glance where to go and how to get there, how much the journey is going to cost, and more to the same purpose. It is well and clearly printed in red and blue inks on pale primrose paper, and there is a useful little map of the southern coastal area. We understand that 100,000 copies of the folder, together with an accompanying postcard, have been distributed through the post to selected addresses in and around London.

Owing to the large amount of information to be co-ordinated, and special demands upon space in this issue, the "Locomotive Matters" section is held over. A large instalment will be given next month.

Digitized by Google

THE LIBRARY
OF THE
UNIVERSITY OF CALIFORNIA

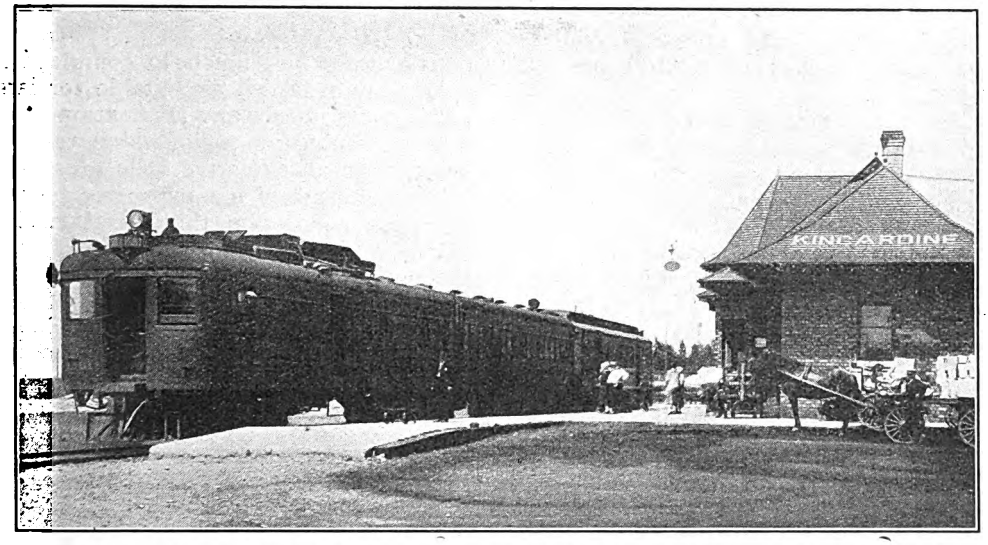
Digitized by Google

THE RAILWAY MAGAZINE.]

DIESEL-ELECTRIC TRAIN FOR THE LONDON MIDLAND AND SCOTTISH RAILWAY.

Engine and Generator Plant supplied by William Beardmore & Co., Ltd.

Digitized by Google



DIESEL-ELECTRIC TRAIN AT KINCARDINE STATION, CANADIAN NATIONAL RAILWAYS.

Oil Engines for Rail Cars and Locomotives.

PERFORMANCE UNDER SERVICE CONDITIONS AND ECONOMIES REALISED.

FOR a good many years past there have been frequent suggestions that, in due course, and despite the probabilities of great extensions of electric traction, the internal combustion engine will eventually become an important factor in the working of mainline railways. There is, indeed, a great deal to be said for this development, in that, just as the petrol engine has rendered motor traction on roads an everyday feature, so it follows that the high fuel efficiency of the internal combustion engine, the fact that large fuel supplies can be carried in small space, and the elimination of the steam boiler and the need for carrying about some thousands of gallons of water and providing for frequent replenishment thereof, constitute important arguments in favour of locomotives incorporating such motive power elements.

Apart from these advantages, however, the fundamental factor which really attracts all concerned is that the oil engine is the prime mover which has a higher efficiency than any other that we have, and such a type of engine uses in weight of fuel (oil) only one-eighth to one-tenth of the weight of fuel (coal) used by a steam locomotive. Even in a coal country like this, the remarkable difference in the amount of fuel consumed, taking into account the price of oil here, enables a considerable saving in the fuel bill to be achieved.

Furthermore, in almost all cases the attention required, that is to say, the driving of such an engine owing to the fact that no boiler, and therefore, no stoking, &c., is necessary, gives a 50 per cent. saving in labour, and is, in effect, a parallel to the work of a motor chauffeur but on a larger scale.

The problems involved in bringing such an engine into practical use are, however, substantial, and it is only by degrees that they have been and are being overcome. The transmission, that is, the means of transferring power from the engine (originally one which was run at a constant rate) to the wheels, and of providing for variations of demands in the way of speed, load, forward and backward movement,

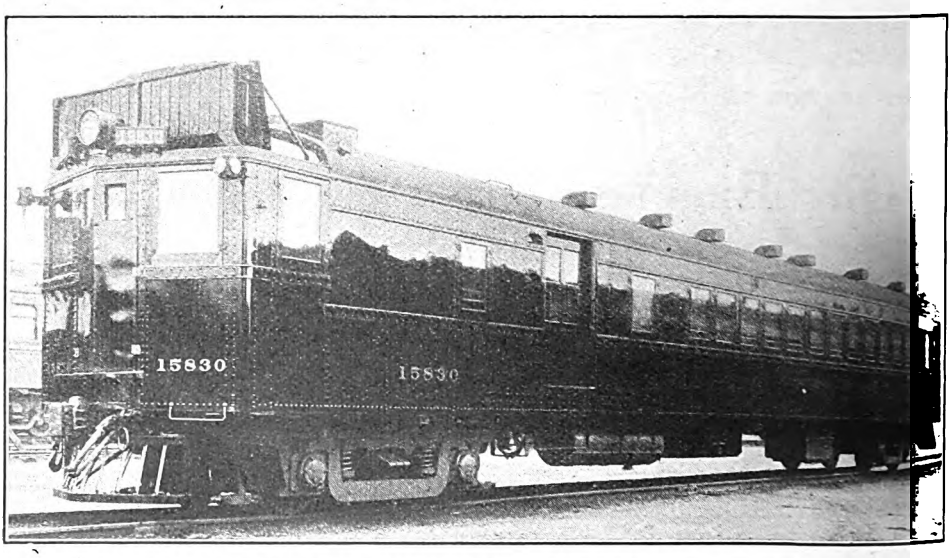
Digitized by Google

shunting, &c., has constituted one difficulty.

Another is perhaps that to the railway mind the engine included a greater number of rapidly-working mechanical parts than the steam locomotive, which despite its success in motor-bus and lorry work might, it was thought, call for skilled and specialist oversight, in operation as well as in the shops and sheds. It had, therefore, to be proved to the railway world that motors of this kind could "stand up" to the relatively rough conditions which unavoidably characterise railway locomotive traction as distinct from stationary plants and even marine motor applications. Hence, it follows, that until these problems, and some others, had been solved, locomotive units utilising internal combustion engines were not regarded as practicable for general introduction, in that they would have to stand the test of service under the most arduous conditions and to be at least as free from risk of breakdown as the standard steam locomotive, and must not require more overhaul and maintenance equipment than is the case under steam conditions; in some senses, perhaps, a pessimistic view, having in mind the enormous extent of road transport by internal-combustion engines against both steam and electric trams. While the petrol motor had much to commend it, it was not regarded as suitable for large power units; hence any application of the internal combustion engine which was to be adopted on an extensive scale must have in view the use of less expensive fuel oil, in which connection the Diesel type of engine, which permits of the use of crude fuel, appeared to offer most advantages.

Attempts to solve the problems thus offered have been made in many parts of the world, and in most cases on the basis of a self-contained motor unit, with some examples of actual locomotives for heavy shunting, and in a few cases for road service. In fact, during the last 12 to 20 years, quite a number of trial cars and engines have been built in the United States, Germany, France, Switzerland and elsewhere with some in this country, and a few have obtained a degree of standard service. Most of these are, however, of petrol engine design, with mechanical gears and transmission, or of petrol-electric types, that is, they use a petrol engine to drive a dynamo which supplies current for the traction motors, thus meeting transmission problems, while allowing the petrol engine to operate under conditions favourable to itself.

Though experiments with motors of



73-FT. CAR IN SERVICE ON THE CANADIAN NATIONAL RAILWAYS.
One of these cars was shown at the Baltimore & Ohio Railroad Centenary Exhibition, 1927.

Digitized by Google

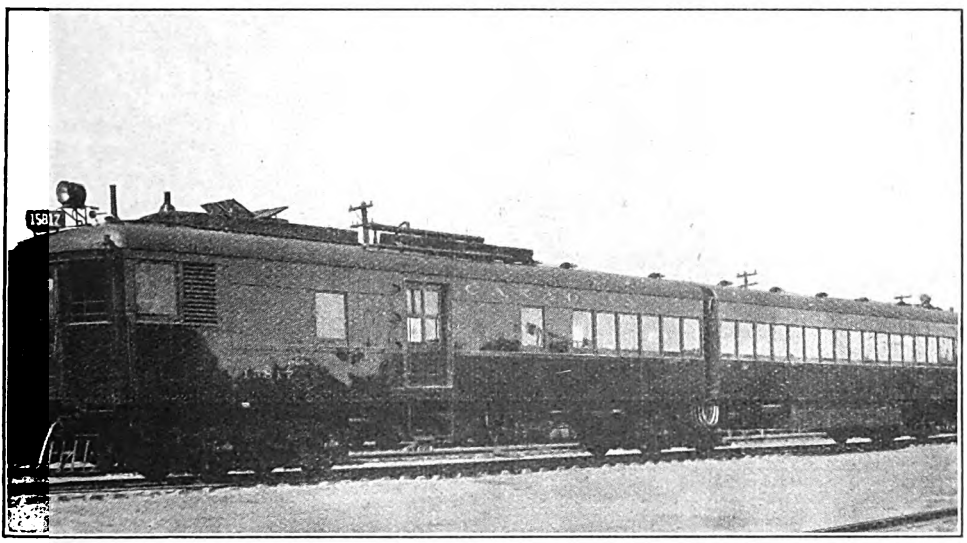
Diesel type have been in progress abroad, in this country its application for rail cars or locomotives has been delayed, though it has received close attention on the part of several railways.

The most serious difficulty in applying the standard Diesel oil-engine has been its great weight, and it was not until the engine was taken up by the firm of William Beardmore & Co. Ltd., and after long and thorough research and development carried out, that it was really overcome. A further advance was also made in that it was demonstrated that the engine thus produced could successfully operate over a wide range of speeds, and it may now be said that the internal combustion engine, using cheap residual oil as fuel, is now making undeniable progress as a prime mover for locomotion on railways. While much of the work which has been done has been of a research character, having great educational value, enough has been done in the way of actual application to cause the chief mechanical engineers of railways all over the world to study the engine and results achieved and to consider methods of employing it for the particular duties of their own railways.

One main consideration in the employment of the engine has been the question of transmission, and many methods have been evolved. In some cases, proposals have gone no further than design, but several others have actually been put into use which may roughly be divided into mechanical, hydraulic, electric and pneumatic or gaseous methods.

The best known practical example of the mechanical type is a toothed gear drive incorporated in a locomotive designed by Prof. Lomonossoff for use on the Russian railways. Transmission gears of the hydraulic class are usually of smaller power and these are found in rail cars.

The oil-electric type has been used to a greater extent with much larger powers on rail cars, and Prof. Lomonossoff has designed a large Diesel-electric locomotive which has been in service on the Russian railways for some time.

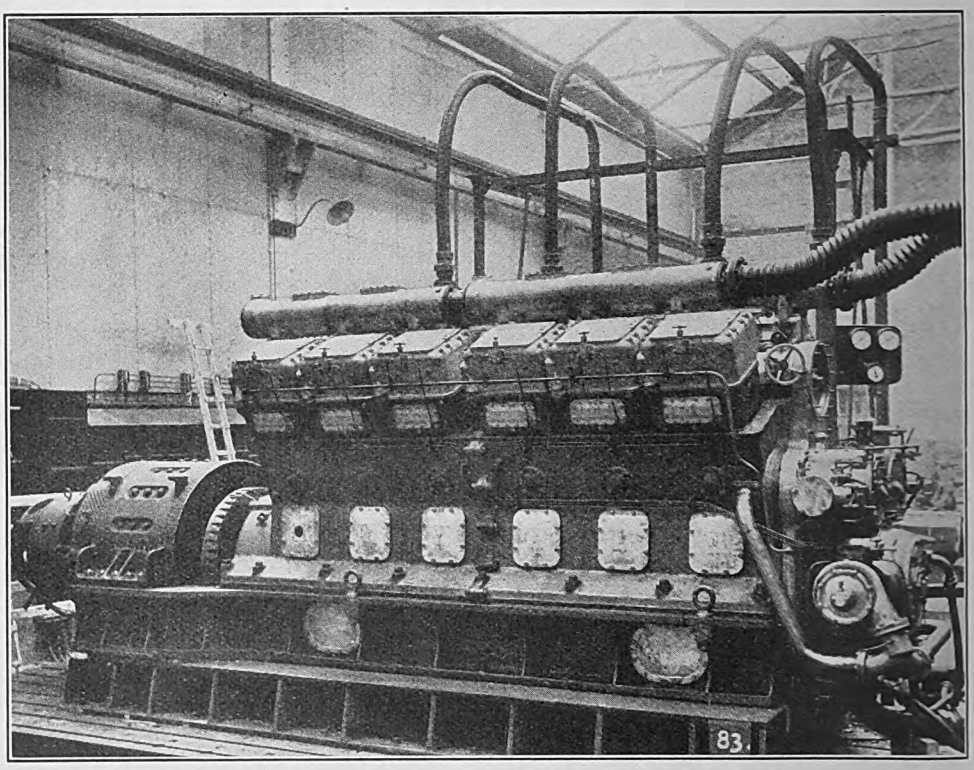


LARGE ARTICULATED CAR SEATING 126 PASSENGERS AND FITTED WITH 8-CYLINDER ENGINE.

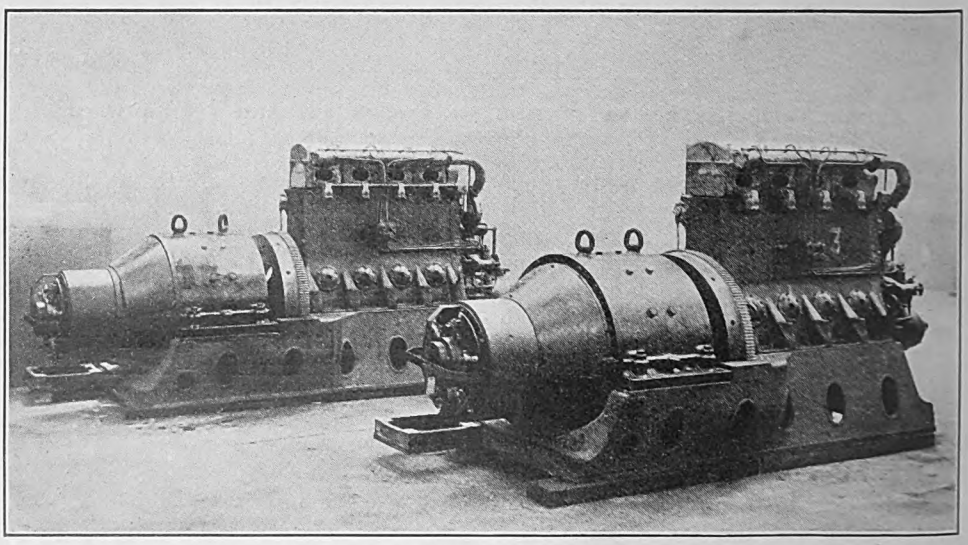
Combination systems using gaseous means for transmission—that is to say, a compressor on the main engine compressing fluid which operates driving cylinders coupled to the wheels after the manner of the ordinary steam locomotive—form a very interesting type, of which, however, little practical experience has been gained.

There appears, however, to be little doubt that the preferred method of transmission for railway purposes, at

Digitized by Google



TWELVE-CYLINDER V-TYPE 1,250 B.H.P. ENGINE FOR DIESEL-ELECTRIC LOCOMOTIVE.



TWO DIESEL-ELECTRIC FOUR-CYLINDER SETS, DEVELOPING 200-B.H.P. UNITS, AS USED FOR THE SMALLER TYPES OF CARS.

Digitized by Google

any rate in the near future, will be of the electrical type as the use of the high-speed oil engine has so cut down generator weights, &c., that when the latter is coupled with a variable speed engine, it is difficult to show any material gain by the use of other systems. Furthermore, owing to the road shocks which are so very material in locomotive work, the risks with other methods are greater than with the electrical, and for passenger service the greater possibilities in acceleration are great assets.

It is, therefore, proposed to describe a type of engine produced by Wm. Beardmore & Co. which is eminently suitable for railway use, together with some of the cars in which such engines have been installed.

The engines fitted in all the cars referred to in this article work on the four-stroke cycle and are of the Beardmore patent quick-running type which, whilst retaining the light weight and other essential characteristics derived from experimental work on the first engine constructed, which was designed from experience gained from aircraft engines, operate on a modified Diesel cycle, and burn crude oil of low cost. The oil is injected into the cylinders through a sprayer at a considerable pressure, and it is ignited by the temperature of compression, the use of sparking plugs, magnetos, &c., being entirely obviated. The compression pressure employed is quite moderate, but is high enough to ensure certain ignition and complete combustion of the fuel. The engines are water cooled and forced lubrication is employed for all the bearings so that no more attention is required than that given to the normal motor-car engine. The cooling water of the engine is circulated through radiators to reduce its temperature after use, and these are usually, but not essentially, fitted on the roof of the car. These power units are of robust construction, of handsome appearance, and are remarkable for their small size, light weight and relatively high horse-power, which result has been achieved solely by the scientific selection and arrangement of the materials employed in their construction.

An important constructional feature is the steel monobloc crankcase in which the longitudinal and transverse stresses are carried, and which forms a very rigid unit structure or stress member. The crankcase is bored out to receive the cylinder liners which are of hardened steel, and the space between the outer wall of the liners and the inner wall of the crankcase, forms a common water jacket. It also carries the crankshaft bearings and has strong base supports cast integral with it, for bolting the engine to the underbed. Large inspection doors are provided which give access to the big end bearings.

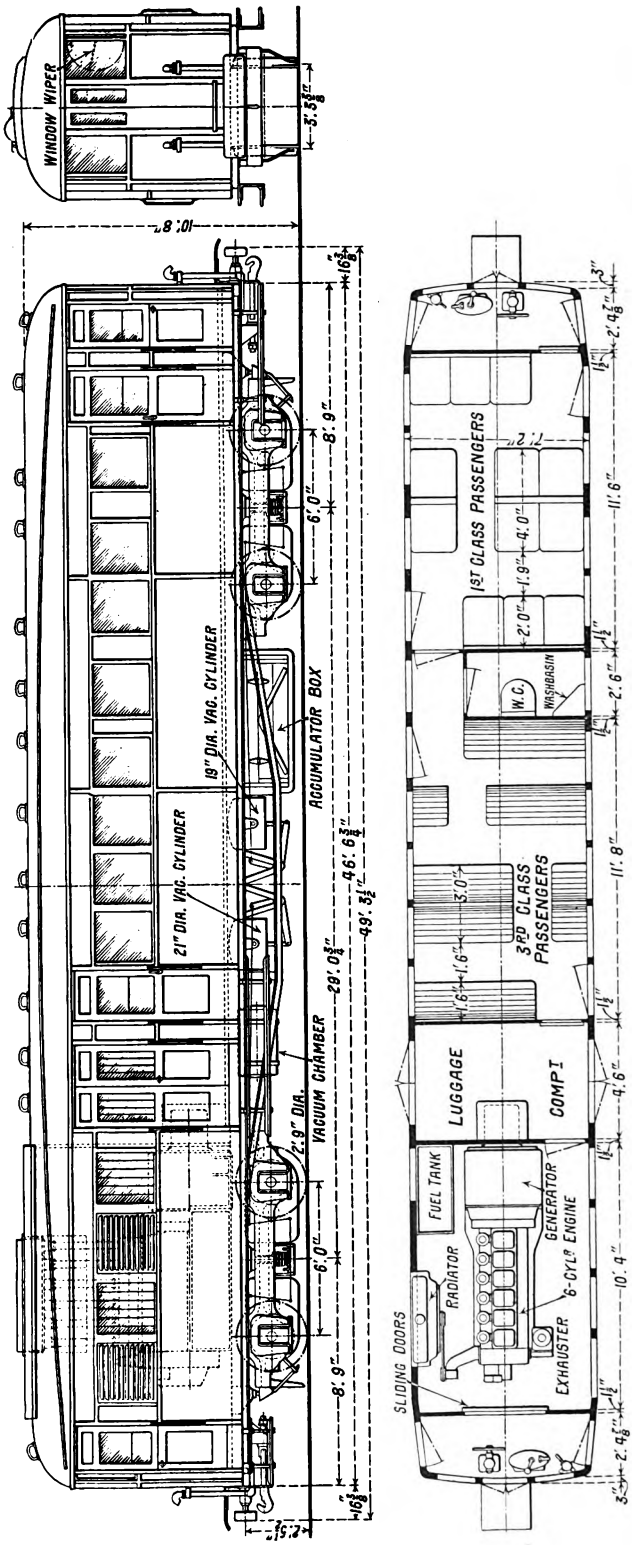
A solid forged crankshaft of high-grade steel is used, the pins and main journals of which are ground, and a coupling flange is provided for the attachment of the flywheel and generator armature. The main bearings are furnished with bushes lined with white metal, and they are lubricated by a continuous pressure oil system.

The connecting rods are made from special steel drop forgings, which are tested for weight. The top end bearing is a solid phosphor bronze bush whilst the large end is fitted with a pair of bushes white metal lined and an adjustable liner to take up wear.

The pistons are made from forgings of special aluminium alloy, and they are machined all over and balanced before finishing. Each piston carries a number of cast-iron rings and a scraper ring. The gudgeon pin is of the full-floating type, and is made of case-hardened nickel steel ground to size. The cylinder heads are made of aluminium alloy, and are provided with large water spaces and contain the valve seats which are made from high-grade alloy steel and cast in position.

Each cylinder head carries two exhaust, two inlet valves, and a central automatic-spray atomiser. Compression release is obtained by lifting the exhaust valves. The valves are manufactured from special steel stampings, and they are actuated by valve tappets and rollers from the camshaft. Motion from the tappets is transmitted to the valves by means of push rods and valve-rocker levers which are mounted in the cylinder heads. The valve gear is entirely closed in by a light aluminium cover. The camshaft is of one piece of hardened nickel steel and is driven from he crankshaft through a train of gears,

Digitized by Google



ELEVATION AND PLAN OF DIESEL-ELECTRIC CAR FOR THE PAMPLONA-SAN SEBASTIAN RAILWAY, SPAIN.

Digitized by Google

contained in a special end casing which is quickly detachable from the main crank-case. This casing also forms the housing for the gear-wheel spindles which drive the cooling water and oil-circulating pumps.

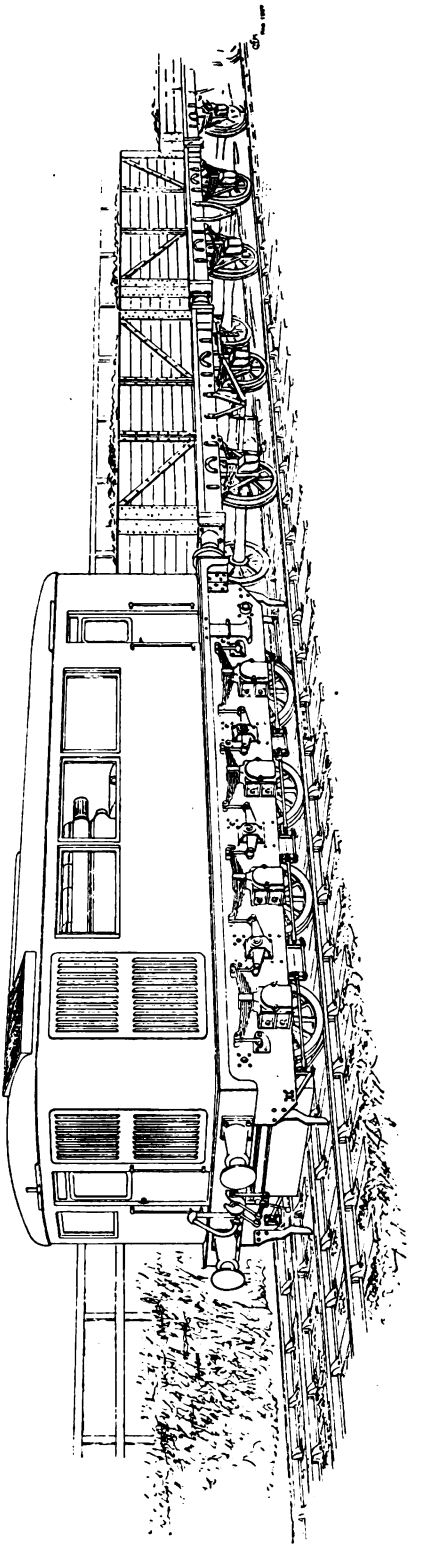
A primary pump maintains a low pressure on the suction side of the main fuel pumps, each plunger of which supplies two cylinders by means of a switch valve interposed between the delivery side and the atomisers. The injection is timed and the power output of the engine is controlled by varying the effective delivery stroke of the plunger, and excess oil is returned to the fuel tank through a by-pass.

The governor is of the totally-enclosed type and is so connected to the fuel-pump controls that a plus and minus speed variation is given. An automatic over-speed cut-out gear is fitted and provision is made for adjusting the governor speed range, also for a hand control for speeds below the governor range. The cooling water is circulated from the storage tank through the cylinder jackets, from which it passes to the cylinder heads and thence to the radiator. The water then returns to the water-storage tank.

Lubrication is arranged on the well-known pressure system, oil being drawn from the engine sump by the pressure pump at the gear-case end. It is then forced through filters mounted on the engine and then passes through the crank-shaft to the journals and pins and also to the top end bearings. Another distributor carries oil to the centre of the camshaft, from which the camshaft bearings are lubricated, and the surplus oil from all the bearings returns to the sump.

The engine is controlled from the driver's master switch, and a predetermined speed range is provided which allows the engine to be controlled by the governor at each of these speeds by moving the driver's master controller, which also controls the circuits for the electric apparatus and motors.

The prime movers installed in the articulated cars described later have eight cylinders of 8¼-in. bore and 12 in. stroke, the rating being 320 H.P. and the weight approximately 5,600 lb. The engines are direct-coupled to specially designed D.C. generators of 200-kW. and 600 volts, built by Westinghouse, which supply



1,000-B.H.P. DIESEL-ELECTRIC LOCOMOTIVE FOR HEAVY GOODS TRAFFIC.

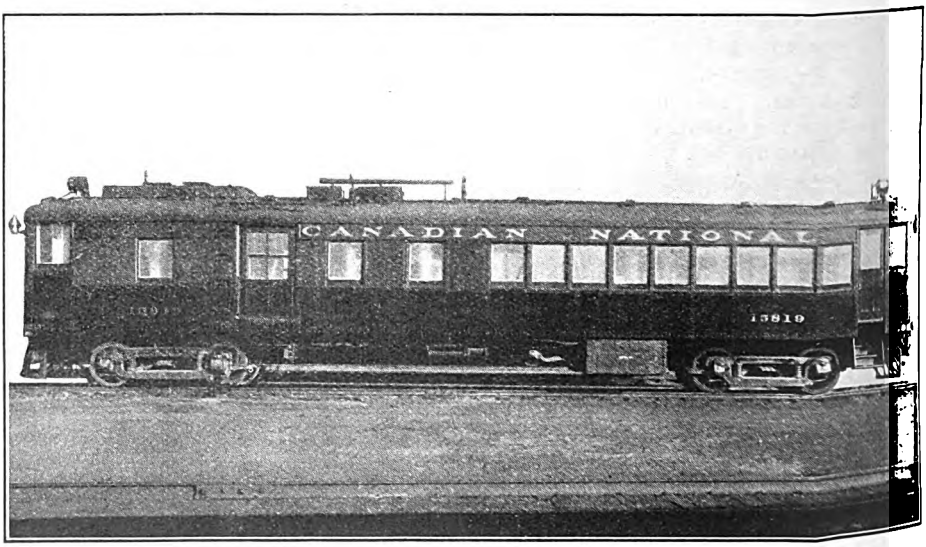
Digitized by Google

current to the four driving motors of 100 H.P., 600 volts, two of which are mounted on the front truck and two on the rear. The installation fitted in the 60-ft. cars is similar, but of smaller power, the engines having only four cylinders and a rating of 160 B.H.P. British Thomson-Houston generators are used for these.

The engines fitted in the new type of cars, as exemplified by that shown at the Baltimore Centenary Exhibition, have six cylinders $8\frac{1}{4}$-in. bore by 12 in. stroke, and develop 300 B.H.P. at 750 r.p.m. The engine and flywheel together weigh approximately 6,900 lb.

volt 215-H.P. railway motors, which are mounted on the leading truck and connected through helical gears, having a 20 : 59 ratio.

The first two cars constructed were of the articulated type, similar to those introduced on some of the British lines, that is, the complete car consists of two portions, the outer ends of which are mounted on four-wheeled bogies, whilst the inner ends meet at the centre of a third four-wheeled bogie. The total overall length of this type of car is 102 ft. and the weight when fully loaded is 94 tons. The cars are built of steel and they are equipped



60-FT. DIESEL-ELECTRIC CAR, CANADIAN NATIONAL RAILWAYS.

The electrical equipment consists of a 198 kW. 300-volt D.C. 600 amp.-generator, which is compound wound and mounted on the same bedplate with, and rigidly connected to the engine. Liners are placed between the bedplate and the car sills to absorb vibration. On the same shaft as the generator is mounted a 5·6-kW. 64-volt auxiliary generator, which is connected to an 84-volt M.V. A17 Exide Ironclad battery carried in a steel battery box suspended from the rear part of the floor, which furnishes a starting circuit for driving the generator as a motor. The battery is charged by the auxiliary generator when its voltage falls below that of the generator. The balance of the electrical equipment consists of two 569 C4, 600-

with reversible type seats which are comfortably upholstered. One half of the car contains the engine room, a luggage compartment and a passenger compartment, whilst the other half is a smoking compartment. The total passenger accommodation provides seats for 126 persons and the joint at the centre is protected by a canvas covering of the type normally used at the vestibule ends of the cars of steam trains.

One of these cars attained a maximum speed of over 60 miles per hour and covered a distance of 117 miles in $2\frac{1}{4}$ hours actual running time, giving an average of 52 miles per hour. The fuel consumption worked out at $3\frac{1}{2}$ miles per Imperial gallon, which represents a fuel cost of less than 3 cents

Digitized by Google

(1½d.) per mile, whilst for the same journey, the cost of fuel for a steam train of the same capacity is from 20 to 27 cents (10d. to 1s. 1½d.) per mile.

In addition to the two articulated cars, seven single cars have been placed in service. These have an overall length of 60 ft. and they are mounted on two four-wheeled bogie trucks. Standard buffing and draft gear is fitted for hauling a trailer, the engine is placed at one end, ample baggage space is provided, and there is seating accommodation for 56 passengers. On the journey between Montreal and Toronto, in Canada, an average speed of over 45 miles per hour is maintained.

Within a month or two of being placed in service, one of these cars made a through run from Montreal, Quebec, to Vancouver, British Columbia, a distance of 2,937 miles in 67 hours. On this remarkable run, the engine was not stopped once and on the long climb through the Rocky Mountains, the speed never fell below 40 miles per hour, even on the steepest gradients, whilst the average speed for the whole journey worked out at 43½ miles per hour.

This achievement created two new records in railway transportation, one for the fastest run for such a distance, the other for the longest non-stop engine run in railway history. The official report of Mr. S. J. Hungerford, Operating Vice-President, shows that the oil-electric car left Montreal 16 hours after the crack Trans-Continental Train "The Continental Limited," passed it at Winnipeg, and arrived in Vancouver 22 hours ahead.

These two types were so successful that, after approximately eighteen months' actual running experience, it was decided to place a further five single cars in service. In some respects this new car is a departure from the previous ones. The overall length is 73 ft. 9 in., and the interior is divided into four compartments, these being an engine room, baggage compartment, general passenger accommodation and a smoking room. There are seats for 57 passengers, these being so arranged that three persons can sit one one side of the car and two on the other.

The first car of this series made a trial run from Montreal to Toronto, a distance of 334 miles, and covered it in 5½ hours, thus beating the time of the famous "International Limited" by over two hours, and thereby created a new record for travel between the two cities. This is an average speed of more than 60 m.p.h. for the 334 miles, a speed which should meet all conceivable desires of passengers.

The new type of car has been referred to as "the most economical power unit in use on any railway in the world," and owing to its success the railway officials were asked to show one of them at the Exhibition held last year in connection with the Baltimore and Ohio Centenary Celebrations. In response to this request one of these cars, No. 15830, which had already been in service for over 10,000 miles, was taken from London, Ontario, to Baltimore, a distance of 803 miles under its own power, and was seen by officials at all the big towns. The fuel consumption during this journey was 5·3 miles per gallon, and whilst at the Exhibition this car caused more interest with engineering visitors than any other motive power.

During 1926 the nine cars introduced in 1925 covered a total distance of 451,991 miles and earned $337,041 (£67,408) in revenue, whilst operating expenses, including repairs and an allowance for mechanical department supervision, amounted to $127,421 (£25,484), leaving nett earnings of $209,620 (£41,924). It is said that in the service between Edmonton, Alberta, and Saskatoon, Saskatchewan, on which two cars were operated, the working costs, as determined by selected accounts, averaged 23 cents (11½d.) per train-mile, as compared with $1·01 per train-mile for steam operation, the saving in operating expense as compared with the steam-train operation on the 120,087 miles covered in this sum being given as $93,677 (£18,735). Up to the end of 1927 the 14 cars supplied had run a total mileage of 1,080,000.

An interesting development of the system is shown in the motor train that has been constructed for the London Midland and Scottish Railway, and of which a colour view is given in the frontispiece. This consists of a four-coach train, the engine installation being similar in many respects to those already described. An eight-cylinder 500-H.P. engine is installed at one end of the train, and is completely controlled by a master electric switch as in suburban electric sets.

Digitized by Google

Digitized by Google

how completely the service requirements of a railway are being met by the development of this most economical and ingenious method, which has in this case demonstrated that in all cases, at least a reduction of costs of 50 per cent. can be attained.

William Beardmore & Co. Ltd. have also just lately received orders from the Spanish railways for a number of Diesel electric cars of similar type. With the financial assistance and expert advice of the Spanish Government all the secondary lines in Spain are to be brought up to a much higher commercial standard than hitherto, and the placing of the present order is one of the first steps in this direction. The new cars will be entirely British in construction.

Those which are being put into service on the Pamplona-San Sebastian Railway will have to operate over one of the most difficult routes in Spain, including a climb over the Pyrenees, where an altitude of over 2,000 ft. above sea-level is reached. The mountainous country traversed, and the varied atmospheric conditions met with, make the running of a regular and punctual train service a very difficult task, and the Diesel-electric rail cars now on order have to perform very arduous duties in this respect.

INTERIOR OF THIRD-CLASS SECTION, L.M.S.R. DIESEL-ELECTRIC TRAI .

These Diesel-electric cars for Spain are not of such large proportions as those in Canada, as the gauge of the railway is only 3 ft. 3⅜ in. The dimensions of the cars are 49 ft. 3 in. over the buffer and 7 ft. 2 in. and 10 ft. 8 in. in width and height respectively. The Beardmore engine to be fitted is capable of developing over 200 h.p.

A complete range of engines suitable for rail cars, motor trains and locomotives are now manufactured by William Beardmore & Co. Ltd. For those intended for use in rail cars and motor trains, cylinders

Digitized by Google

Digitized by Google

Matthew Murray and the Blenkinsop Locomotives.

By R. E. M. BLEASDALE.

MATTHEW MURRAY may be regarded as one of the connecting links between the fully recognised inventive genius of Trevithick and that of Stephenson—as one whose highly mechanical ability was exercised when the locomotive had been abandoned, and who brought it to a successful issue after it had been regarded as a total failure. He was born at Stockton-on-Tees in 1765, and, having shown at an early age a natural bent for mechanics, he was apprenticed to a blacksmith. On becoming a journeyman he probably worked for a short time with John Kendrew, a flax-spinner of Darlington, where he obtained some experience with machinery which afterwards proved of great use to him.(*a*)

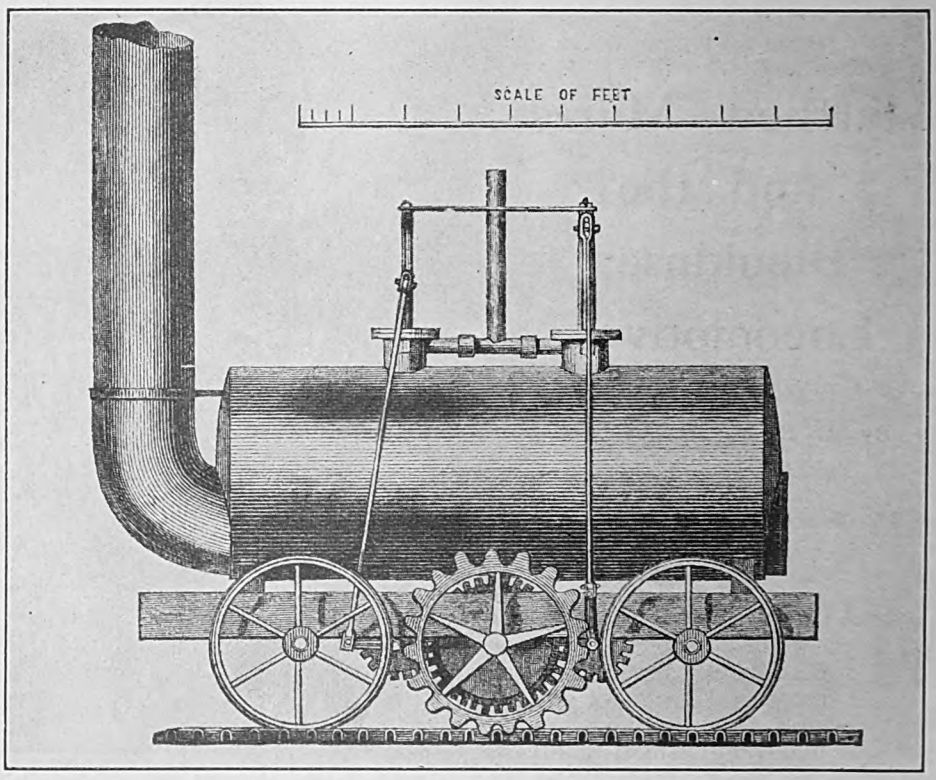
Realising that the trade of a blacksmith did not allow him full scope for his decided penchant for invention, he proceeded to Leeds in 1789, where he obtained work in the firm of Messrs. Marshall & Co., flax-spinners. His mechanical ingenuity soon became apparent in the various improvements effected, one of which was the introduction of the "sponge weight," an appliance used for damping the front rollers of the spinning machines, and which eventually led to a complete change in the methods of flax-spinning. He seems to have quickly attained to a post of responsibility with this firm, taking out patents in 1790 and 1793 for spinning frames and textile carding engines.

In 1795 Murray severed his connection with Messrs. Marshall & Co. and commenced business at the Round Foundry, Leeds, as an engineer and manufacturer of flax machinery, taking as his partners James Fenton and David Wood, who financed the undertaking. It is said that a crisis, with which the flax-spinning industry was threatened at this time, was averted mainly by the superior machinery introduced by him. Murray was responsible for steam-engine patents which were taken out in 1799 for regulating the heat in the boiler and steam pressure in the cylinder, and in 1801 and 1802 for other improvements in the steam engine, the latter specification embracing the invention of the *short* D slide valve, and the right-angled crank drive which was embodied in the Blenkinsop locomotive. It is said that Murray's firm had a reputation for supplying the finest screw-cutting lathes and cylinder boring machines, and a comparative list of prices of steam pumping engines, dated August 16, 1804, is extant, showing that Messrs. Fenton, Murray, and Wood were keen competitors of Messrs. Boulton and Watt and of Richard Trevithick.(*b*)

(*a*) "Industrial Biography." By Samuel Smiles. 1878. p. 261.

(*b*) "Simon Goodrich and his Work as an Engineer." By E. A. Forward, M.I.Mech.E. *The Engineer*, October 27, 1922.

Digitized by Google



MURRAY'S BLENKINSOP LOCOMOTIVE.

The success of Murray's firm so exasperated Messrs. Boulton and Watt that, with the idea of preventing any further extension of the Round Foundry, they purchased the adjoining land. Murray was indefatigable in his exertions to improve the design of the steam engine, with which he was more particularly interested, and he is said to have been the first to arrange the piston horizontally in the condensing engine. One of his steam engines, it may be noted, erected at Water Mill, Leeds, in 1813, "was regularly running until 1885, and is still in good condition."(*c*) In connection with his flax-spinning machinery, his inventions were recognised by the Society of Arts, who awarded him the gold medal in 1809.

In 1811, John Blenkinsop, of Walker-on-Tyne, as viewer and part owner of the Middleton Colliery, three and a half miles from Leeds, conceived the laudable idea of dispensing with horse haulage and substituting some form of steam power. The wagon-way from Middleton Colliery to the wharves at Kidacre and Great Wilson Streets, Leeds, was made in 1758, and was the first railway to be sanctioned by Parliament. Previous to 1811 the track was laid with plates probably cast at Hunslet Moor foundry, Leeds, and the chaldron wagons were drawn by horses. Blenkinsop was assisted in drawing up a specification for a patent by a Mr. John Straker.(*d*)

Locomotive theories were rather nebulous at this period, and Blenkinsop's patent of April 10, 1811, though definite concerning the "toothed rack" and the "wheel having teeth," was ambiguously vague in regard to the general design of the engine. Murray was prepared, however, to try his hand at the experiment contemplated by his friend Blenkinsop, though it is apparent that the latter had a hazy notion of adopting either the general principles embodied in Trevithick's Penn-y-darran locomotive or of the 1805 engine of Trevithick design built by Mr. Whinfield,

(*c*) "Dictionary of National Biography," 1909. p. 1296.

(*d*) "The Northern Coal Trade." By Dunn. 1844. p. 52.

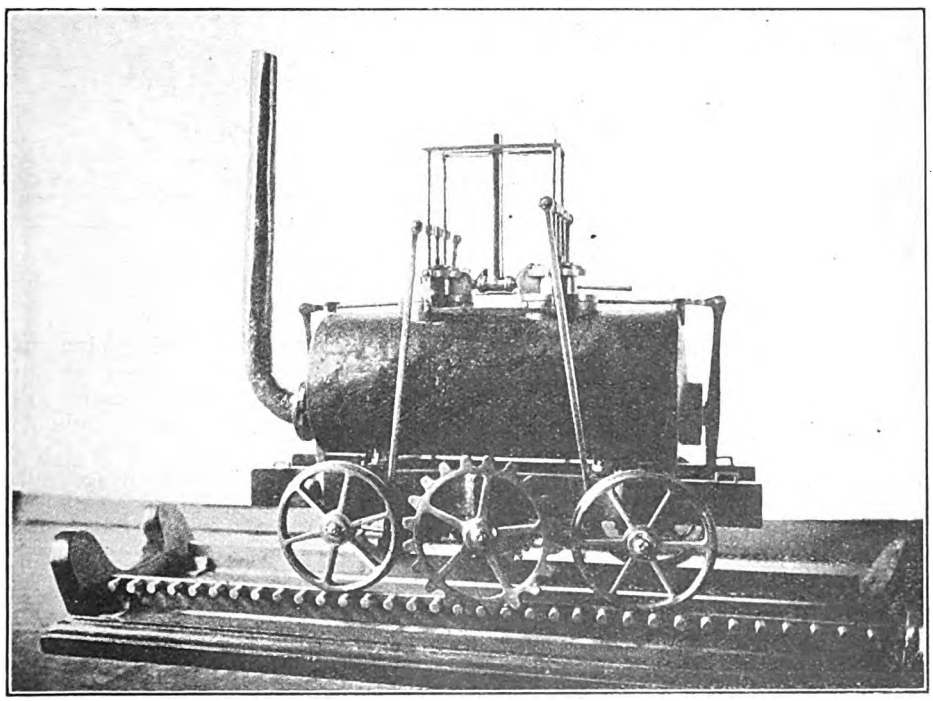
Digitized by Google

of Gateshead. In the third clause of the specification Blenkinsop proposed to "connect the wheel" (the driving wheel) "with the first mover" (the steam cylinder) "by crank, assisted by a fly" (wheel), features which were characteristic of the Trevithick pattern. It is probable, therefore, that the superior mechanical ability of Murray, coupled with the notorious failure of the Gateshead locomotive, determined the new departure in the design of the Middleton engines.

The proposed cylinder was increased to two, and the cranks, working at right angles to each other, displaced, once for all, the flywheel. Retrogressive steps were taken, however, when the single flue was decided upon, and when the exhaust steam was made to discharge into the atmosphere. Intermediate spur gearing was adopted, in common with the Wylam locomotives—a coincidence purely accidental; and, though similar in distribution, it differed from the latter in having four, instead of two cranks. It is remarkable that both Murray and Hedley should have utilised the toothed circular iron gearing invented in 1766 by John Murdock, father of William Murdock; and it is an equally remarkable coincidence that both inventors introduced two cylinders into their engines, Murray being entitled to priority probably by about three months.

Two engines were built by Messrs. Fenton, Murray & Wood in 1812, the *Salamanca* and the *Prince Regent*, costing £400 each. The first locomotive made an initial journey on June 24, an account of which appeared in the *Leeds Mercury* of June 27, 1812. "At four o'clock in the afternoon the machine ran from the coal staith to the top of Hunslet Moor, where six, and afterwards eight, wagons of coal, each weighing 3¼ tons, were hooked to the back part. With this immense weight—to which, as it approached the town of Leeds, was superadded 50 spectators—it started on its return to the coal staith, and performed a journey of 1¼ miles, principally on a dead level, in 23 minutes without the slightest accident. *Salamanca* and *Prince Regent* commenced work on August 6, 1812, and in the year following, two more locomotives, *Lord Wellington* and *Marquis Wellington*, were supplied by Murray's firm.(*e*) These engines had

(*e*) "Dictionary of National Biography." 1909. p. 1296.



MODEL OF 1812 LOCOMOTIVE IN LEEDS PHILOSOPHICAL MUSEUM.

Digitized by Google

Digitized by Google

workmanship . . . it was placed on the tramway . . . on September 2, 1813, and a large concourse of spectators assembled to witness its first performance. This locomotive drew sixteen chaldron wagons, containing an aggregate weight of 70 tons, at the rate of about 3 miles an hour. George Stephenson and several of the Killingworth men were amongst the crowd of spectators that day."(*g*) It is said, however, that the "engine at Coxlodge was found very unsteady and costly in its working; besides, it pulled the rails to pieces, the entire strain being upon the rack rail on one side of the road. The boiler, however, having shortly blown up, there was an end of the engine, and the colliery owners did not feel encouraged to try any further experiment."(*h*) In consequence of this failure, public opinion in the Newcastle district once more became hostile to this innovation: those in charge of the locomotives were probably incompetent, the promoters were apathetic and for the time being steam power was abandoned.

The Middleton engines were fitted with spring loaded safety valves in 1815.(*i*), and continued to work until about 1835. It is related by John Hackworth that the Tsar Nicholas of Russia "had witnessed with great pleasure the running of 'Blenkinsop's' engines on the colliery line from Middleton to Leeds" in 1816.(*j*) In a letter written by Murray in 1824 he refers to "a small locomotive engine . . . . sent several years ago to Russia." Nothing further is known of this locomotive; presumably it approximated in dimensions, etc., to its prototype. It is probable that Thomas Gray, the indefatigable advocate of the principles of railway locomotion, and more especially of the rack-rail, visited the Middleton line in 1819 or 1820; and it is on record that the deputation from the promoters of the Liverpool and Manchester Railway, Messrs. Ellis, Sanders, Booth and Kennedy, also paid a visit in 1825 to this and other "collieries in the North of England where locomotive steam engines" had "for several years been employed to transport the coal wagons to the nearest land or water communication."(*k*) A second deputation, consisting of Messrs. Rastrick and Walker witnessed the working of Murray's locomotives in November, 1828, on which occasion it was found that, on an average, $2\frac{3}{4}$ lbs. of coal was consumed for each ton of coals conveyed 1 mile at the rate of 4 miles per hour.(*l*)

Probably the best drawing of a Murray-Blenkinsop engine is the one published in 1821 by Thomas Gray in "Observations on a General Iron Railway,"(*m*) the rack rail is, however, drawn incorrectly. Another drawing, differing in important details, is to be seen in "A Treatise on Railroads," by Nicholas Wood, the 1831 edition. In this drawing the boiler appears to have been made larger, and the diameter of the flue and chimney to have been increased. The teeth of the rack rail are correctly drawn; but the fish-bellied under portion of the rail is omitted. It is probable that the engines were subsequently rebuilt with different dimensions, approximating to the following:—

Boiler:—Length, 10 ft. 6 in. Diameter, 4 ft. 2 in.

Flue and chimney:—Diameter, 22 in.

Cylinders:—8 in. diam. by 24 in. stroke.(*n*)

A third illustration of a locomotive of this type is an old engraving showing the engine hauling eleven chaldron wagons of coal across a viaduct, presumably on the outskirts of Leeds.(*o*) A supposed original model of the first engine is preserved in the Museum of the Leeds Philosophical and Literary Society, of which a photograph is shown (page 437.) This rack rail is a modern copy and unlike the original.

Murray is recorded to have been a builder of boat engines, and it is stated that "a steamboat to ply between Yar-

(*g*) "Life of Stephenson." By Samuel Smiles. 1857. p. 82.

(*h*) *ibid.* p. 83.

(*i*) J. G. H. Warren in a letter to *The Locomotive Magazine.* January, 1926.

(*j*) "Timothy Hackworth and the Locomotive." By R. Young. 1923. p. 276.

(*k*) *The Mechanics' Magazine.* October, 1829. p. 131.

(*l*) On "The Comparative Merits of Locomotive and Fixed Engines as a Moving Power." By J. Walker, C.E. 1829.

(*m*) See also *The Mechanics' Magazine*, January 3, 1824.

(*n*) "Timothy Hackworth and the Locomotive." p. 63. By R. Young. 1923.

(*o*) See THE RAILWAY MAGAZINE, March, 1925.

Digitized by Google

mouth and Norwich was . . . fitted up in the canal basin at Leeds" in 1813.(*p*) This steamboat performed its appointed task for four years, at the end of which period it finished its career as abruptly as did one of the Coxlodge locomotives, by exploding. This happened in 1817.(*q*) In common with William Murdock and other early inventors, all Murray's tools were designed and made by himself. He is one of several who claimed to have invented the planing machine. This probably existed in the embryo stage in 1802, when the *short* D slide valve was introduced, in the finishing of which "it was found necessary to form two perfectly plane surfaces."(*r*) The *short* D slide valve formed part of one of Murray's stationary engines as early as 1810(*s*), and the planing machine was perfected in 1814. It is not known with certainty as to whether any more locomotives were built by Murray's firm during his life time. He certainly declined on behalf of the firm to supply the Stockton and Darlington Railway with engines until such time as the high pressure locomotive had become established "as a regular article of commerce."(*t*) Murray died at Holbeck near Leeds on February 20, 1826, in his sixty-third year, and was buried in Holbeck churchyard.(*u*)

Although the general outline for steam propulsion at Middleton colliery originated with Blenkinsop, it must be borne in mind that Murray made a bold and praiseworthy attempt to solve a most difficult problem at a time when the commendable exertions of others had unhappily proved abortive. Had he followed in the steps of Trevithick in regard to the exhaust steam, by turning it into the chimney, it is probable that the steaming power of his locomotives would have been much greater and their success more assured. Nevertheless the labours of Matthew Murray have handed down to posterity a practical experiment in steam motive power; and to him is due the merit of having produced the first commercially successful locomotive.

(*p*) *Leeds Mercury*. June 24, 1813.
(*q*) *Society of Arts Journal*. 1877. p. 943.
(*r*) "Industrial Biography." By Samuel Smiles. p. 262.
(*s*) "The Steam Engine." By Farey. p. 692.

(*t*) "The North Eastern Railway." By W. W. Tomlinson. p. 118.
(*u*) "Dictionary of National Biography." 1909. p. 1296.

At the time of his death Murray was engaged in designing a locomotive which had as its chief feature the distribution of weight upon two separate carriages; but this engine was never constructed. The firm of Fenton, Murray & Wood became Fenton, Murray & Jackson in 1830, and was dissolved about 1843.

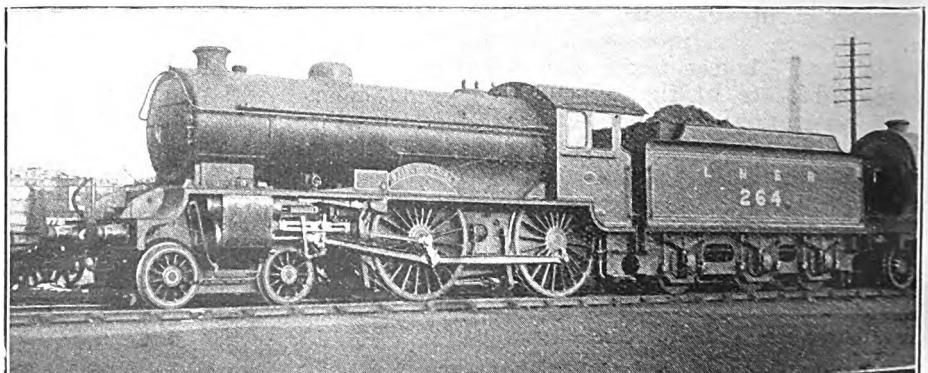
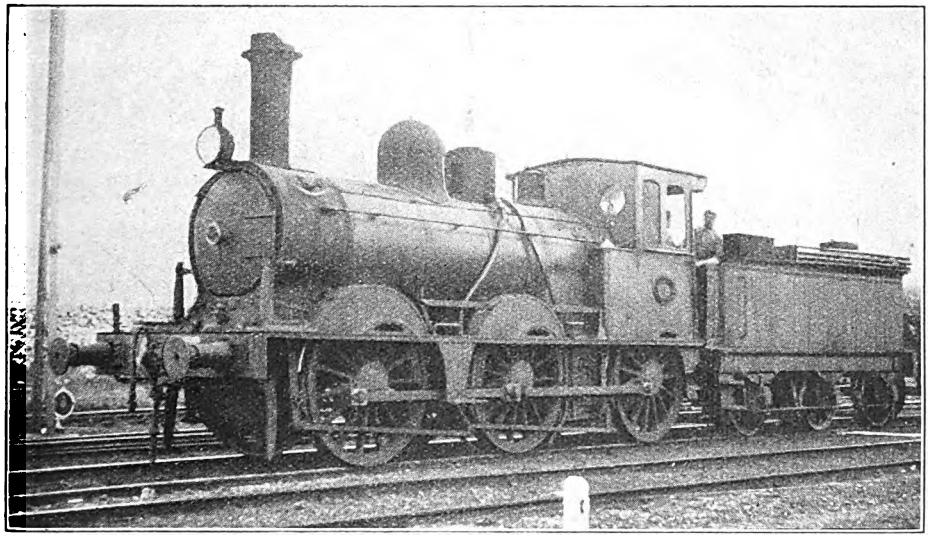


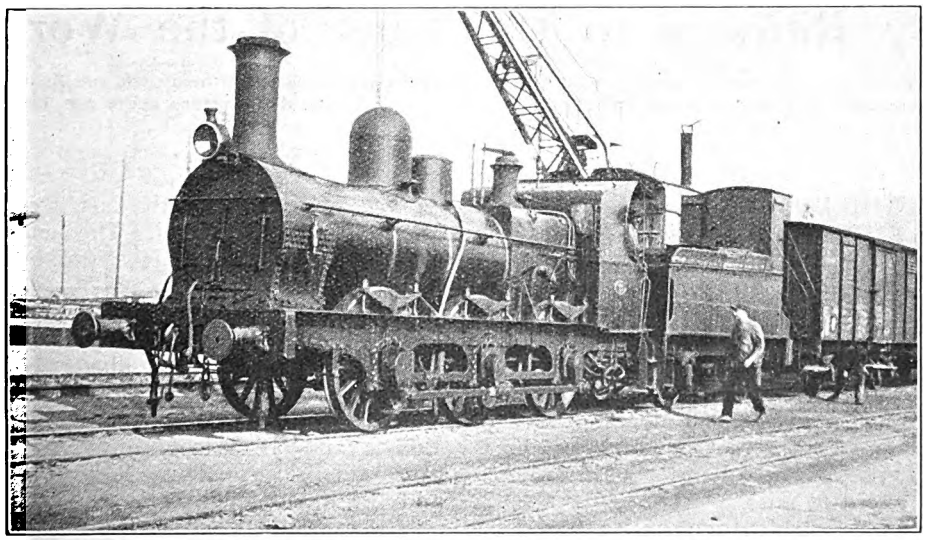
Photo.] [*P. Ransome-Wallis.*

L.N.E.R. THREE-CYLINDER 4-4-0 LOCOMOTIVE No. 264 "STIRLINGSHIRE."

Digitized by Google

TWO LITTLE-KNOWN CONTINENTAL LOCOMOTIVES.





WE are indebted to Mr. J. C. Ainsworth for the photographs reproduced, taken at Terneusen. The upper view shows an engine of the one-time famous L.N.W.R. "DX" class 0-6-0 locomotives, formerly No. 1221 (Crewe Works No. 1500). After working for 29 years on the L.N.W.R., it was sold to the Malines-Terneusen Railway, where it has been for many years No. 18. As rebuilt in Belgium, a few changes have been made, though the general characteristics of the class can still be traced. It is now employed on yard service at Terneusen. The second photograph shows No. 11 of the Gand-Terneusen Railway. Our contributor is unable to supply particulars, though there are several suggestions of British design. Possibly some of our readers can supply further information.

Digitized by Google

Digitized by Google

INTERNATIONAL TRAINS

BETWEEN

CHILE AND BOLIVIA.

(SUBJECT TO ALTERATIONS)

Direct Service between Antofagasta (Chile) and La Paz (Bolivia) in 42 Hours.

Altitude above sea level (metres)	STATIONS		ARRIVE	DEPART
.....	Antofagasta	Tuesday & Saturday	.....	19.50
2272	Calama	Wednesday & Sunday	5.02 C. T.	5.30 B. T.
3702	Ollague	,, ,,	14.03	15.03
3660	Uyuni	,, ,,	20.00	20.30
.....	Tupiza branch: Uyuni	Saturday & Wednesday	.....	8.40
3648	Tupiza branch: Atocha	,, ,,	12.09	.....
3806	Rio Mulato	Thursday & Monday	0.09	0.24
.....	Potosi branch: R. Mulato	Thursday	.....	10.18
3905	Potosi branch: Potosi	,,	19.34	.....
3696	Oruro	Thursday & Monday	6.40	7.30
.....	Cochabamba branch: Cruro	Thursday & Monday	.....	8.30
2381	Cochabamba branch: Cochabamba	,,	18.30	.....
3854	Viacha	Thursday & Monday	.....	13.08
3700	La Paz	,, ,,	14.25	.....

STATIONS		ARRIVE	DEPART
La Paz	Tuesday & Friday	.....	15.30
Viacha	,, ,,	.....	17.02
Cochabamba branch: Cochabamba	Tuesday & Friday	.....	7.30
Cochabamba branch: Oruro	,,	19.30	.....
Oruro	Tuesday & Friday	22.21	22.40
Potosi branch: Potosi	Friday	.....	7.00
Potosi branch: R. Mulato	,,	16.40	.....
Rio Mulato	Wednesday & Saturday	4.42	4.54
Tupiza branch: Atocha	Wednesday & Sunday	.....	14.30
Tupiza branch: Uyuni	,, ,,	18.40	.....
Uyuni	Wednesday & Saturday	7.48 B. T.	8.20 C. T.
Ollague	,, ,,	14.44	14.20
Calama	,, ,,	21.41	22.00
Antofagasta	Thursday & Sunday	6.23	.....

Excellent dining and sleeping car service.

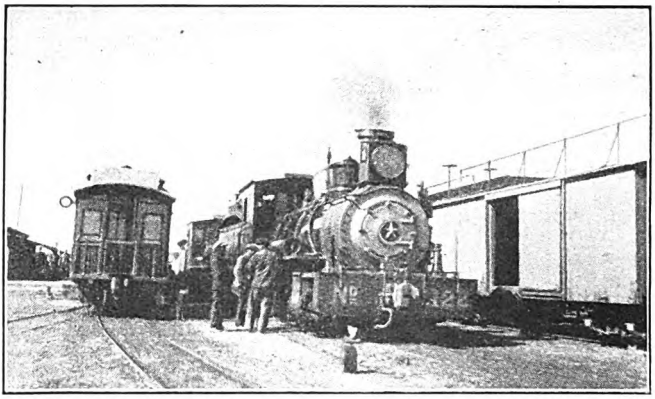
PASSENGER FARES FROM ANTOFAGASTA.

	To Calama	To Uyuni	To Oruro	To La Paz
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
1st class	0 18 8	2 11 4	4 1 5	5 12 10
Bed tickets	0 15 5	0 15 5	1 10 2	1 10 2
Excess luggage (per 100 ks.)	0 14 0	1 12 4	2 3 10	2 19 4

SECTION OF ANTOFAGASTA (CHILI) AND BOLIVIA RAILWAY TIME-TABLE.

(*See Map on page* 449.)

Digitized by Google



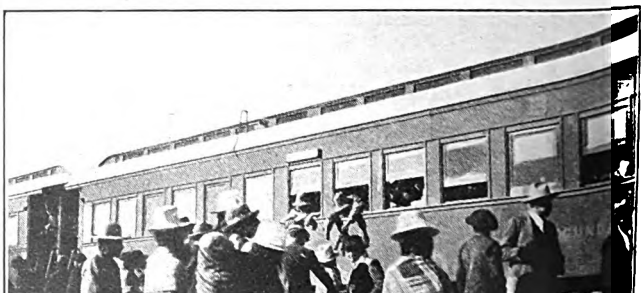
OLLAGUE STATION YARD, ANTOFAGASTA (CHILI) & BOLIVIA RAILWAY, SHOWING INTERNATIONAL TRAIN ON LEFT AND DOUBLE-HEADED FREIGHT TRAIN ON RIGHT.

ing close on three days, on the Chilean Longitudinal Railway from Santiago. The connection for La Paz leaves the same night, and unless one travels on that, an enforced stop of four days at Antofagasta is necessary. I stopped over and had a most interesting time on the 2-ft. 6-in. gauge lines in and around the port. I had expected to find something in the nature of a toy railway, but was soon to discover that, on the contrary, it was an extremely well-equipped system, capable within reasonable limitations of all the work performed on the broad-gauge lines.

The Antofagasta yards have a capacity of 1,300 wagons, including metre-gauge stock, a third rail being laid in the track to accommodate vehicles on the wider gauge. At the end of one of the yards I saw a long freight train steaming out, and was surprised, on counting up the vehicles, to find that the gross load represented 1,500 short tons—and this on the 2-ft. 6-in. gauge! The freight vehicles are excellent, the standard being a 20-ton wagon, with new 28-ton wagons being placed in service. The latter have a tare ratio of 1 to 3, which is very satisfactory. In connection with goods traffic the railway administration does not perform the work of collection and delivery, the traders having to bring the goods to the cars for loading, and, in the reverse direction, to come to the station for their traffic. The railways do not even advise the traders of the arrival of traffic for them, this being left as a matter between the consignor and consignee.

I was also afforded an opportunity of visiting the locomotive workshops at Mejillones — pronounced Meckiohness — and, incidentally, of meeting Mr. Hood, the Chief Mechanical Engineer. At Mejillones, which is on the coast 40 miles distant from Antofagasta, there are commodious workshops arranged on excellent lines. In the yard I was shown a one-man shunting engine. There are three of these oil-fired engines, each fitted with an arrangement by means of which the oil flow varies in accordance with the movement of the regulator.

I travelled to Mejillones and back on a Drewry rail car driven by a native who didn't believe in losing time. The outward journey was quite fast enough to test the nerves of a seasoned traveller, but it was nothing compared to the mad lick back in the dark. I had been warned of a probable delay at Pampa, where the ordinary train crosses and surely enough there we were delayed. We arrived there at 5.35 p.m. and it was not until 6.50 that we were able to resume our journey. Gee, it was



TYPICAL GROUP AT ORURO STATION.

Digitized by Google

cold. I am sure I walked miles trying to keep warm, as I had no overcoat or wrap. About 6.15, however, over in the far distance I saw the train approaching, the Pyle headlight flashing clearly over the barren desert, and in due course the mixed train arrived. There were only two cars on it, the rest being wagons of grain, &c. And so, having got the staff we resumed our dash down to the sea. I expected every moment to be my last, as the driver took all the nasty curves at a speed that was really frightening. But we kept the road, and I was able, though bruised and shaken, to keep an appointment to dine with the Resident Engineer of the railway and some of his colleagues.

UYUNI STATION YARD, SHOWING METRE GAUGE TRAIN ON LEFT AND 2-FT. 6-IN. GAUGE TRAIN ON RIGHT, ANTOFAGASTA (CHILI) & BOLIVIA RAILWAY.

Those accustomed solely to railway travel in Great Britain and other densely-populated countries of a comparatively flat character would find a trip to these highlands of Chile and Bolivia of absorbing interest. The railways, even to British eyes, would appear strangely small, as the gauge in Chile is only 2 ft. 6 in. wide, while the Bolivian lines are on the metre gauge.

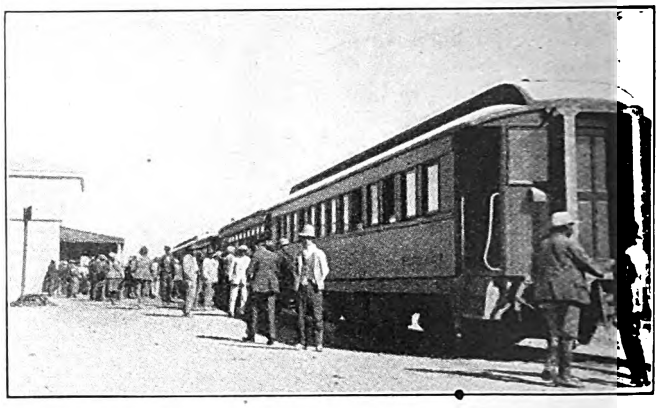
The scanty rains and the topography of the country have resulted in a line being built in which important engineering structures are comparatively few. At the same time, heavy earthworks have been necessary in many parts. The main line from Antofagasta soon rises to considerable heights, reaching a maximum altitude of 3,955 m. just beyond Ascotan. The minimum grade on the line is 3 per cent. and the minimum curves 120 m. radius. The main line portion of the Bolivian system runs through undulating pampas country, with easy grades and curves, an exception being found in the last 10 miles into La Paz, where 3 per cent. grades and up to 15 degrees curves had to be used.

A section of the timetable showing the international train service between Antofagasta and La Paz is reproduced, and from this it will be seen that the journey of 725 miles occupies 42 hours, but it is made in every comfort, as the trains are provided with excellent dining and sleeping cars. Even on the 2 ft. 6 in. gauge there was nothing lacking in either particular. The rugged nature of the country will be appreciated from the accompanying map of the railway.

GENERAL VIEW OF UYUNI STATION WHERE METRE AND 2-FT. 6-IN. GAUGES CONNECT, ANTOFAGASTA (CHILI) & BOLIVIA RAILWAY.

The train leaves Antofagasta in the evening, and so until daylight dawns one can see nothing of the country, and, as a matter of fact, there is then very little to see. After leaving the coast the line crosses the extensive nitrate district of the province of

Digitized by Google



ANTOFAGASTA (CHILI) & BOLIVIA TRAIN AT EUCALIPTUS.

Antofagasta, thence through the copper mining centre of Calama. Here and there we passed railway settlements, but that apart there was simply nothing but sand, and in the far distance mountains and high hills. It was desolate in the extreme. At Ascotan, 223 miles from the coast and nearly 13,000 ft. high, I saw llamas for the first time and a little further on, passed many skeletons and dried corpses of donkeys, horses and other animals. They were lying all over the place, quite close to the railway, yet even where they were near settlements nobody apparently bothered to dispose of them. Surely, it could not be healthy, but there it was. The line later skirts the well-known borax deposit at Cebollar, and thence continues across the Great Bolivian tableland.

As we went further ahead towards Uyuni, we passed from the barren desert, here and there, into broad and expansive valleys, reasonably fertile. Still the mountains frowned down upon us. I felt quite tired of mountains, and sighed for the empty plains of the Argentine or the fertile fields of Cheshire as a relaxation. Mountains really become quite monotonous. At this point we were about 12,000 ft. high, or over two miles in the air!

We arrived at Uyuni towards 8 p.m., and there it was necessary to change from the 2 ft. 6 in. gauge to the metre gauge. This train was composed of excellent stock with dormitorio (sleeping car) and comedor (dining car) in the formation, and there was no lack of room in the berths. Oruro was reached just before 7 o'clock the next morning, and there another change had to be made—this time to an ordinary compartment car of small merit. There were not even arm rests in the first-class coaches to relieve the strain of a seven-hour journey. But there was a comfortable dining car on the train, and I managed to retain a seat there. *Esta muy buena.*

A spectacular Indian boy transferred my baggage for me, and after seeing that operation through I hurried out to see the sights. Oruro was the absolute limit. If you could have been with me at that station you would have thought that you had dropped into Bedlam. Women, wearing peculiar billycock hats of white straw, ornamented with a black fringe, and covered with gaudy shawls, were there in scores, all selling some sort of food, fruit, mush, bread, and other things of which I could make nothing. Most, if not all, were Indians, and the males of that species were there in abundance, carrying all sorts of loads to and from the train. The people there wandered about in bare feet, hardened apparently against all sorts of troubles. Nearly all the women had babies strung behind them, and they were squatting about the station in every conceivable attitude. What on earth they were waiting for I do not know. There was another train at Oruro bound for Machacamarca—wherever that is—but they were not bothering about that. Yet there they were, in the station, for what? I wonder. To describe the scene fully would require a more facile pen than mine; it was wonderful, and altogether astonishing. I shall never forget Oruro—the gaudily-attired Indian women, all squatting on the ground with the most mixed sort of food you ever saw, the Indian males handling all kinds of bulky packages on their humps, the soldiers all looking very important, and, of course, fully equipped with swords and revolvers; and, altogether, the general ensemble.

Oruro is a widely-flung town, apparently of considerable importance—presum-

Digitized by Google

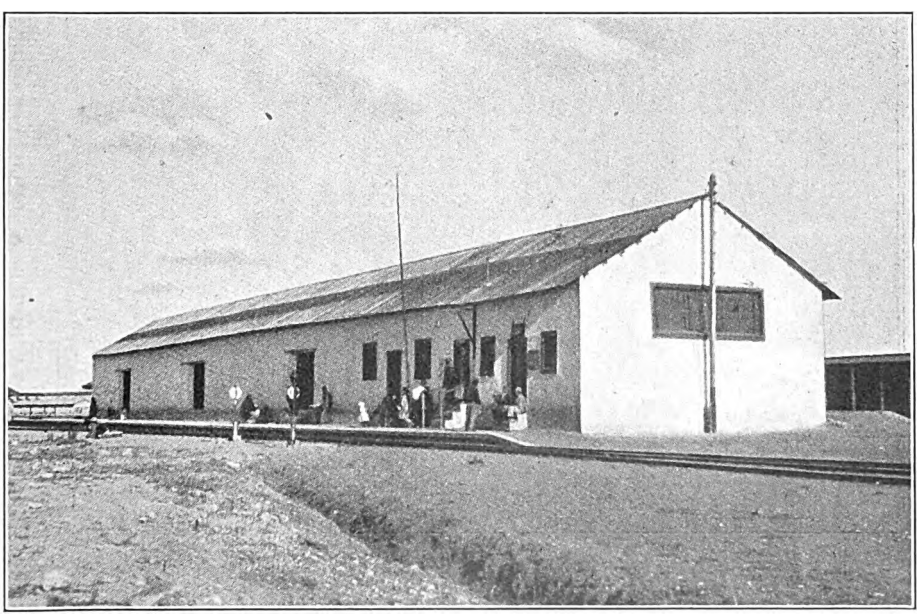
ably from the mining point of view—and it was some time before we again reached the barren desert country that appears to be the general run out there. We were travelling at a height of 12,500 ft. above sea level just beyond the township, rising later to nearly 16,000 ft., and I was relieved, some time later, to see a trace of grass on the ground. Barren sand had hitherto been the whole of the vista, and it was a great relief to see something approaching verdure, although it was coarse.

The train from Oruro to La Paz comprised a flat car, conveying a motor car, two cattle wagons conveying horses, a postal van, three second-class cars, two first-class cars, two sleeping cars, one dining car and a brake van—and it ran jolly well!

As the journey proceeded we reached quite good country, and saw a lot of sheep and cattle, while there was on both sides of the line, a thin verdure of grass. Very soon afterwards, we came across several semi-fortified places, in each of which were huts, apparently tenanted by the Indians. They looked more like mushrooms, with their thatched tops, and their sloping sides. What the outer walls were for I could not imagine, 'cos there were so many holes in them. They were weird. Surrounded by scores of dogs—there's no dog tax in that Continent—the living places are of the most peculiar construction—and they apparently house multitudes of people.

Far to the right, as we travelled on, we could see a great, gaunt mountain, which must have been a tremendous height. I found later that it was Illimani, 21,000 ft., the second highest peak in South America. Cone-shaped, it was entirely covered with snow, and, as I found out later in La Paz, it dominates the city. A wonderful sight! Getting nearer La Paz we entered rocky country, such as I have seen nowhere else in the world. Towering cliffs, scoured out into all conceivable shapes and sizes, presumably by the effluxion of time and weather, stood out in bold outline against the clear blue sky. There below, was the city, with its red tiled roofs, looking more like doll-houses. As we went on, the view changed somewhat; we naturally got nearer views of the city, and through the rocky clefts the glimpses were grand. There we were, approaching La Paz, well styled "The Metropolis of the Roof of the World," and getting scenic views that were grand, majestic, and altogether picturesque.

It seemed almost impossible for a train ever to negotiate the precipitous slopes, but by a wonderful series of loops and curves,



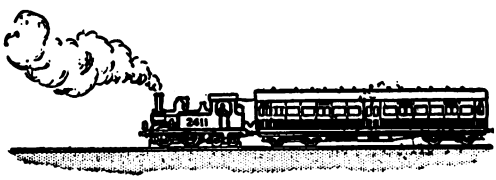
VIACHA STATION, THE SO-CALLED "CREWE" OF BOLIVIA.

Digitized by Google

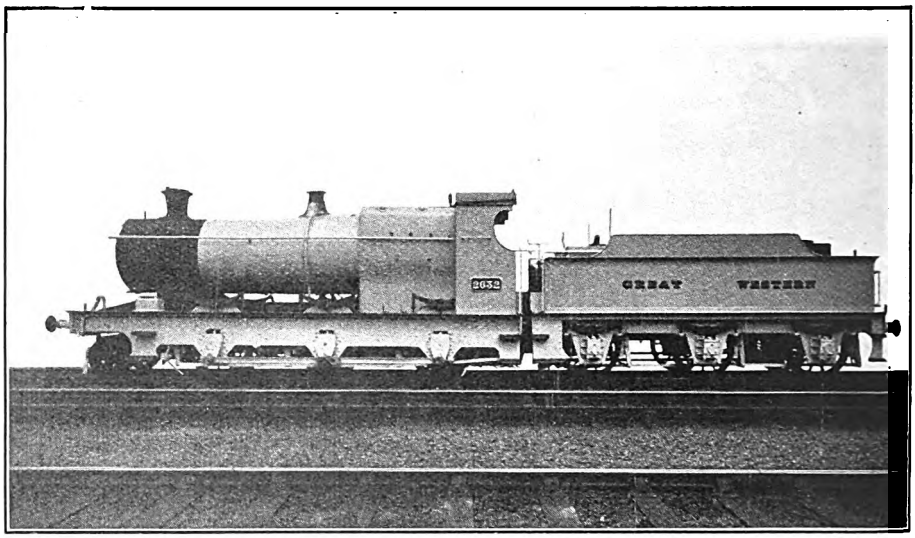
Digitized by Google

we eventually worked our way down from Viacha, facetiously termed the "Crewe of Bolivia," through Kenko, over the edge of the world, and down to the old-world city of La Paz, with its two stations of no architectural merit.

The article entitled "The International Rail Route between Argentina and Bolivia" published in the May issue of THE RAILWAY MAGAZINE, briefly describes the ast stage of the journey, and refers to La Paz. But it leaves the reader there. Personally, I went on by the Guaqui-La Paz Railway; Lake Titicaca and the Southern Railways of Peru to Arequipa and the Pacific port of Mollendo. That journey makes a most interesting story which I hope to tell in a later contribution.



Digitized by Google



2-6-0 MINERAL LOCOMOTIVE NO. 2632.

Modern Locomotive Practice on the Great Western Railway. [No. V.]

By F. W. BREWER, A.I.Loco.E.

WHEN describing No. 36, the 4-6-0 of 1896, I mentioned that another engine of the same type, for working heavy goods and mineral traffic, had been designed by Mr. Dean and built at Swindon in 1899. This second engine was numbered 2601.* Apart from having 4 ft. 7½ in. six-coupled wheels and double frames, it was radically different from No. 36. The latter, it will be remembered, had 20 in. by 24 in. inside cylinders, 165 lb. pressure, a domed boiler, and Mansell bogie wheels with outside bearings. In the case of No. 2601, however, the cylinders were 19 in. by 28 in., the pressure was 180 lb., the boiler a non-domed one (and incidentally of rather remarkable construction), while the bogie wheels were of the spoked kind with inside frames. The chief feature of the boiler was the large, flat-topped, Belpaire type of firebox with which it was fitted, this firebox having a combustion chamber 3 ft. 6 in. long extending into the boiler barrel, after the plan devised by McConnell on the L. & N.W.R. in 1853. The firebox was of the wide type, the casing being 5 ft. 10 in. wide and 7 ft. in length. The inner box had a grate area of 32·19 sq. ft., and a heating surface of 166·8 sq. ft. The latter, added to 1,712·88 sq. ft. in 324 1⅞ in. tubes, brought the total heating surface up to 1,879·68 sq. ft. The boiler barrel, which was pitched with its centre line 8 ft. 9 in. above the rails, had a length of 10 ft. 6 in. and a maximum outside diameter of 4 ft. 10 in. At its front end, just behind the chimney, was a large sandbox, which was fixed saddle-fashion across the barrel, and to enable the sand to be replenished, three footsteps, one above the other, were riveted to the sides of the smokebox; the sandbox itself also had a step. The tractive force of No. 2601 was 27,865 lbs., and the weight of the engine in working order was 63 tons 16 cwts. The load on the coupled wheels, 51½ tons, was borne by groups of spiral springs placed on top of the outside footplating. At a later period, the "boiler" sandbox was taken off and steam-sanding (with boxes below the footplate) was substituted.

Nine further engines with the same type

* A photo-block of this engine appeared in the April issue, p. 287.

Digitized by Google

of boiler, but with a leading two-wheeled pony truck in substitution for a four-wheeled bogie, and with shorter frames, were turned out, these engines being, therefore, of the 2-6-0 type. The second engine, No. 2602, was built in 1901, and had laminated springs for the leading pair of coupled wheels, and spiral springs for the other pairs. The hangers of the former were connected by compensating levers to the springs of the pony truck. This engine weighed 68 tons 8 cwt., and had 51 tons 16 cwt. available for adhesion. The remaining examples of this class, Nos. 2603-2610, were turned out in 1903. When new, the engines had 36¾-ton tenders, which had a water capacity of 3,000 gallons. In order to facilitate turning, smaller tenders were subsequently provided. A pony truck was, I think, eventually fitted to No. 2601 in place of the four-wheeled bogie.

In 1899, when this engine appeared, a piston stroke of 28 in. was still comparatively uncommon, although it is in use in a good many engines at the present time. Some of the Bouch 0-6-0's on the old Stockton & Darlington Railway, together with a few of the Stirling engines of that type on the Great Northern, about 1870-71, had this length of stroke, as also, of course, had the Stirling 8 ft. singles; and Mr. Dean himself had tried it in a 0-6-0 which was fitted with the Joy valve-gear in 1883. The "2601's," which were nicknamed the "Krugers," were probably the next British locomotives to have a 28-in. stroke. Curiously enough, no further G.W.R. engines seem to have been built with it until last year, when the new "Kings" were given it. In 1902, however, Mr. Dean adopted an even longer stroke, viz., a 30-in. one. This stroke had been employed by Bouch in ten outside cylinder 4-4-0's constructed for the Stockton & Darlington Railway in 1871-74, but between then and 1902, when the first of the Great Western 4-6-0 outside cylinder two-crank engines appeared with it, it does not seem to have been used at all. Its employment is still confined to the G.W.R., on which line it has been a success, and has in no way militated against the attainment of high average running speeds, in spite of the relatively high piston speed which it necessarily involves. On the other hand, it has not been adopted for the Great Western four-cylinder 4-6-0's, but it is noteworthy that in the latest development of these engines, the "King" class, the piston stroke has been lengthened from 26 in. to 28 in.

With regard to the use of a combustion chamber in combination with a wide firebox, as in the "Krugers," it is worth remarking that this type of firebox, which was brought out in America by J. E. Wootten in 1877, also had a combustion chamber. The latter feature was afterwards omitted, but was restored for boilers of more modern design. In England, wide fireboxes having combustion chambers are in use to-day, in the case of the Gresley and Raven "Pacifics" on the L. & N.E.R. Thus does history repeat itself.

After running a few years, the "2601's" were rebuilt, and were finally made members of a class of somewhat smaller, double-framed, inside cylinder 2-6-0's, known as the "Aberdares," the first engine of which, then numbered 33, and now 2600, had been brought out by Mr. Dean in 1900, at which time only one of the "Krugers" was at work. The "33," or "2600" class proper, comprised 71 engines, to which the 10 "Krugers," Nos. 2601-2610, were afterwards added, making 81 in all, as under:—

No.	Date.
2600 (formerly 33)	1900
2621–2653	1901
2654–2680	1902
2611–2620	1903
*2601–2610	1905–7

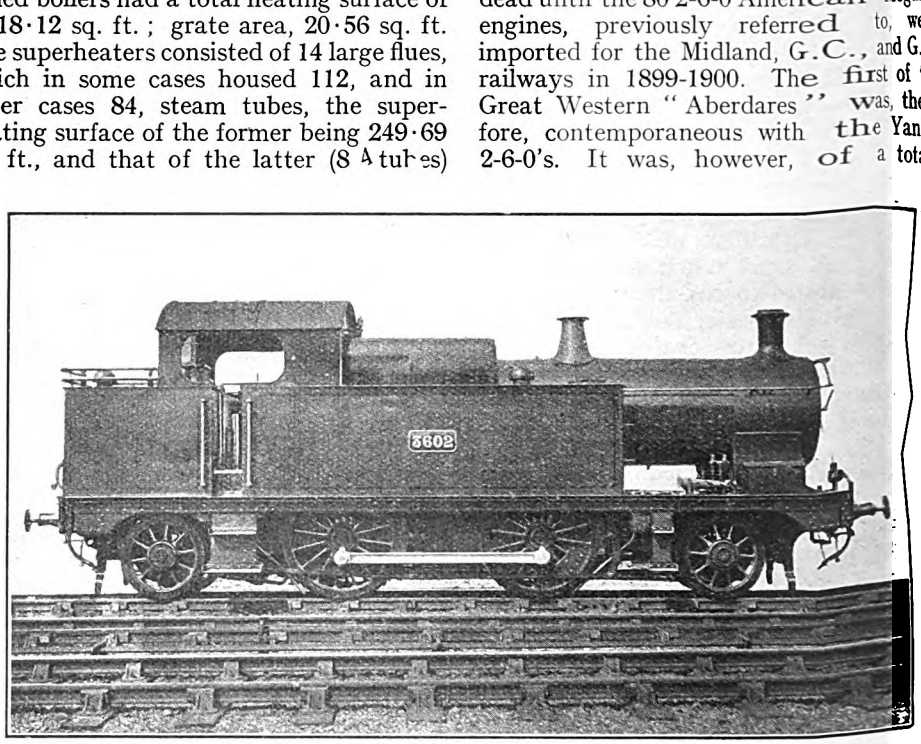
*Rebuilt, formerly "Krugers."

The "Aberdares" had 18 in. by 26 in. cylinders, 2 ft. 8 in. leading wheels, and 4 ft. 7½ in. coupled wheels. The engines number 2600 and 2621-2660 had non-taper Belpaire boilers, the grate area of which was 21·45 sq. ft., and the total heating surface 1,663·02 sq. ft. On the official diagram of No. 33 the steam pressure is shown to have been 180 lb., but the details of this engine published at the time gave the pressure as 200 lb. When, later, the straight-barrelled boilers were replaced by taper ones, the pressure employed varied from 195 lb. to 200 lb. The tractive force at each of the three pressures mentioned was 23,220 lb., 25,160 lb. and 25,800 lb., respectively, figures that demon-

Digitized by Google

strate, incidentally, the importance and value of relatively high working pressures. The taper boilers fitted were 4 ft. 10¾ in. and 5 ft. 6 in. in diameter by 11 ft., and these increased the weight of the engines from 53 tons 8 cwt. to 56¾ tons. The adhesion, formerly 46 tons 16 cwt., was augmented to 49 tons 13 cwt. Before being equipped with superheaters the coned boilers had a total heating surface of 1,818·12 sq. ft.; grate area, 20·56 sq. ft. The superheaters consisted of 14 large flues, which in some cases housed 112, and in other cases 84, steam tubes, the superheating surface of the former being 249·69 sq. ft., and that of the latter (8 tubes) 179·1 sq. ft.; total heating surfaces, 1,728·05 sq. ft. and 1,530·8 sq. ft., respectively. To-day the total is 1,670·15 sq. ft., to which the superheater, which is of the 14–84 size, contributes 191·79 sq. ft.; steam pressure, 200 lb. per sq. in.; weight of engine as when re-boilered, 56¾ tons. The tenders are now of the improved design, but have the same loaded weight, 36 tons 15 cwt., and the same water capacity, 3,000 gallons, as the original ones.

In view of the large number of engines of the 2-6-0 type in use on the G.W.R. at the present time (most of which engines have outside cylinders and 5 ft. 8 in. wheels), it will be of interest to mention that this wheel arrangement, which originated in America, was first introduced into this country by Adams in 15 outside cylinder engines built for the G.E.R. in 1878-79. These G.E.R. 2-6-0's were broken up in 1887, and, with the exception of a couple of 2-6-0's purchased by the Midland and S.W. Junction Railway in 1895 and 1897 (one in each year), the type was virtually dead until the 80 2-6-0 American "Mogul" engines, previously referred to, were imported for the Midland, G.C., and G.N. railways in 1899-1900. The first of the Great Western "Aberdares" was, therefore, contemporaneous with the Yankee 2-6-0's. It was, however, of a totally different design, and it must not be confused with the "Mogul" type proper. The latter has outside cylinders, and, as a rule, inside frames, and to this particular type the G.E.R., Mid. & S.W. Junc. R. and the imported American 2-6-0's all belonged. Later, in 1911, the G.W.R. itself adopted the outside cylinder type, and ultimately built as many as 322* "Moguls." These will be described subsequently. In the modern sense, the type has been re-introduced on the L.M. & S.R. and on the L. & N.E.R. It is also in use now to a considerable extent, on the Southern Railway.



2-4-2 TANK ENGINE NO. 3602.

* This number, I understand, has since been increased.—F.W.B.

Digitized by Google

The year in which the "Aberdares" came out—1900—also witnessed the appearance of two other classes, viz., the "No. 11" class of 2-4-2 tank engines, and the notable "Atbara" class of 4-4-0's.

Only one of the 2-4-2T's was built in 1900, but 30 more were turned out in 1902–3. The first engines of this type had straight-barrelled Belpaire boilers, 10 ft. 3 in. long by 4 ft. 6 in. maximum diameter; steam pressure, 180 lb.; grate area, 21·35 sq. ft.; and total heating surface, 1,561·65 sq. ft. With this boiler the weight of the engines in running order was 64 tons 12 cwt. The cylinders of all the engines were 17 in. by 24 in.; the coupled wheels were 5 ft. 2 in., and the leading and trailing radial wheels 3 ft. 8 in. The later examples of this class were constructed with taper boilers. The initial engine, No. 11, was afterwards renumbered 3600, and the whole series of 31 engines were numbered and built as under:—

No.	Date.
3600 (formerly No. 11)	1900
3601–3620	1902
3621–3630	1903

The engines fitted with taper boilers weighed 66 tons 6 cwt., and I believe they had 195-lb. pressure. This was the pressure, at any rate, of the 2-4-2's when superheated about 1911. The superheaters were then of the 12-flue, 72 steam-tube size, but the present-day practice is to provide this class with single-row apparatus. The "3600's," which were employed mostly on branch-line passenger work, were equipped with steam reversing gear, and with a water pick-up scoop arranged to be operated in either direction. For double-end tank engines they had high-pitched boilers, the centres being 8 ft. from the level of the rails. The taper-boilered and superheated engines, by the way, had extended smokeboxes. The boiler barrels were 10 ft. 3 in. in length, with outside diameters of 4 ft. 5⅛ in. and 5 ft. 0½ in. The grate area was 20·35 sq. ft. At 85 per cent. of the higher pressure (195 lb.) the tractive force of the engines was 18,545 lb. A tank capacity of 1,900 gallons was provided, apparently for the later engines, the capacity in the case of No. 3600 having been 1,850 gallons.

The other class of engines to come out in 1900 were, as stated, the "Atbaras," which were of the double-framed 4-4-0 type.‡ There were originally 40 engines of this class, of which the first 20, then numbered 3373–3392, were built in 1900, and the second 20, numbered 3393–3412, in 1901. One engine, No. 3382, *Mafeking*, was broken up in September, 1911, and 10 other "Atbaras," Nos. 3400–3409, were transferred to the "City" class of 1903, and were renumbered in that class 3700–3709. Of what I may call the old "Atbara" series proper there remained, therefore, but 29 engines in 1926, and

G.W.R. ENGINES.

"ATBARA" CLASS.
Inside Cylinders, 18 in. by 26 in.
4-4-0 Type.
6 ft. 8½ in. Wheels.

Old No.	New No.	Name.	Year Built.
3373	4120	*Atbara*	1900
3374	4121	*Baden Powell*	,,
3375	4122	*Colonel Edgcumbe* (*a*)	,,
3376	4123	—	,,
3377	4124	*Kitchener*	,,
3378	4125	*Khartoum**	,,
3379	4126	*Kimberley**†	,,
3380	4127	*Ladysmith*	,,
3381	4128	*Maine**	,,
3382	—	*Mafeking*†	,,
3383	4129	*Kekewich*	,,
3384	4130	*Omdurman*	,,
3385	4131	*Powerful*	,,
3386	4132	*Pembroke*	,,
3387	4133	*Roberts**	,,
3388	4134	*Sir Redvers**	,,
3389	4135	*Pretoria** (*b*)	,,
3390	4136	*Terrible**	,,
3391	4137	*Wolseley*	,,
3392	4138	*White*	,,
3393	4139	*Auckland*	1901
3394	4140	—	,,
3395	4141	*Aden*	,,
3396	4142	*Brisbane*	,,
3397	4143	*Cape Town*	,,
3398	4144	*Colombo**	,,
3399	4145	*Dunedin*	,,
3410	4146	*Sydney**	,,
3411	4147	*St. Johns**	,,
3412	4148	*Singapore*	,,

* These were cut up in 1927.

† Old No. 3382, *Mafeking*, was broken up in September, 1911. Nos. 4123 and 4140 are running without names. Ten engines, old Nos. 3400–3409, transferred to "City" class.

(*a*) Formerly *Edgcumbe*.

(*b*) Formerly *Sir Daniel*.

‡ An illustration of an *Atbara* was given in the May number, p. 392.

Digitized by Google

these, as will be seen by the accompanying list, were afterwards numbered consecutively 4120–4148. Two of them, Nos. 4123 and 4140, were running without names, and all 29 were included in the so-called "Flower" group. In 1927, 10 of the engines were scrapped, the numbers of these being 4125, 4126, 4128, 4133, 4134, 4135, 4136, 4144, 4146, and 4147.

When new, the "Atbaras" had the "Stroudley" crank arrangement and were fitted with non-taper, domeless Belpaire boilers, which were similar to those of the "Camels," and had 1,663 sq. ft. of heating surface, a grate area of 21·45 sq. ft., and 180 lb. pressure. The engines had 18 in. by 26 in. cylinders, 6 ft. 8½ in. four-coupled wheels, and a weight in working order of 51 tons 12 cwt. It has been suggested that the "Atbaras" were developed from the enlarged "Badminton," *Waterford*, but the engines from which they were really descended were, I consider, the "Camels," being in effect the latter but with larger driving wheels. In 1900 an alteration was made in the shape of the outside framing for the coupled wheels, the framing being carried in a straight line above the side rods, instead of being curved to clear the heads of the rods. The "Atbaras," and also a then new batch of "Camels," had these straight-topped frames. On the other hand, the *Waterford* design was not, strictly speaking, repeated, apart from the domeless Belpaire boiler.

* * *

With reference to the list of the "Bulldog" class which appeared in the May number, p. 394, I must add that the name of *Sir Ernest Palmer* (No. 3368) has been transferred to 4-6-0 No. 2975. The name as at first borne by No. 3368 (old No. 3420) was *Ernest Palmer*. Similarly, the former title of No. 3373 (3425) was *Sir W. H. Wills*, while that of No. 3396 (3458) was *Natal*, and that of No. 3417 (3707) was *Francis Mildmay*.

The name *Emylor* (No. 3041) in the list of 4-2-2's, on p. 396 of the same issue, is of course, a misprint for *Emlyn*.

It will be noticed that the names of three of the "Bulldogs" Nos. 3412, 3413 and 3416, were previously carried by 7 ft. 8 in. single-wheelers.

(*To be continued.*)

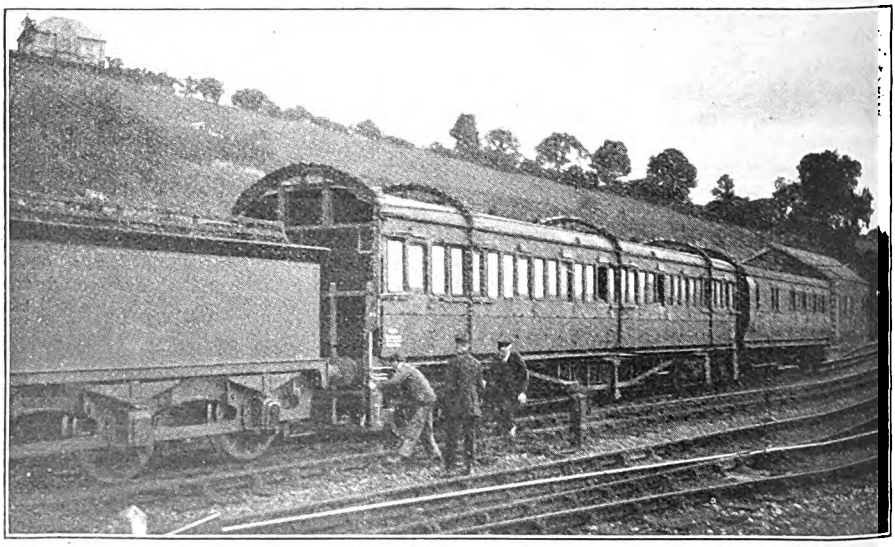


Photo.] [*C. W. Neat.*

SOUTHERN RAILWAY CARRIAGE AT TAVISTOCK FITTED WITH TEMPLATES FOR RUNNING TESTS.

Digitized by Google

To Belfast Via Heysham, L.M.S.R.

As from April 30, the L.M.S.R. Fleetwood-Belfast service has been transferred to Heysham, and three new steamers (*Duke of Lancaster, Duke of Argyll* and *Duke of Rothesay*), each of 3,600 tons, and capable of a speed of 21 knots, introduced to maintain the service. These three steamers are the fastest, largest, and most luxuriously equipped on any cross-Channel service, being modelled on the general principles of ocean liners, and among other refinements having no fewer than 141 single-berth cabins.

The three new twin-screw turbine steamers, which have been built for the L.M.S. Railway Company by William Denny Bros. Ltd., set up a new standard in cross-Channel travel comfort. They are 349 ft. long, 53 ft. in breadth, and have five decks. Sleeping accommodation is provided for 308 saloon passengers, there being four cabines-de-luxe, 141 single-berth rooms, 65 double-berth cabins and seven four-berth rooms, while 104 steerage passengers are also provided with sleeping accommodation. Each of the new steamships will carry 1,500 passengers. The single-berth cabins, which are a feature of the vessels, are modelled on the most modern railway sleeping berths, and are fitted with every possible detail which will contribute to the comfort of the voyager. The same elaborate care of details has been exercised in the case of the two- and four-berth cabins.

Each cabin is fitted with hot and cold water, and there is ample bathroom facilities. On entrance at the bridge deck through wide embarkation doors, one is immediately sensible of the generous space allotted. This entrance hall extends right across the ship, and is 31 ft. fore and aft, having a bureau and ticket office and night steward's office at one end, while the staircases give access to upper and lower decks, and also the vestibules. Vestibules leading to the dining saloon occupy the other end. The entrance is panelled in polished mahogany. Seating accommodation is provided for those who await attention at the bureau or the night steward's office. In this entrance hall, much care has been directed to render the passenger immediately familiar with the location of his cabin and the public rooms, &c. All parts of the ship are simply "sign-posted," so that transfer from train to cabin can be effected with ease and certainty.

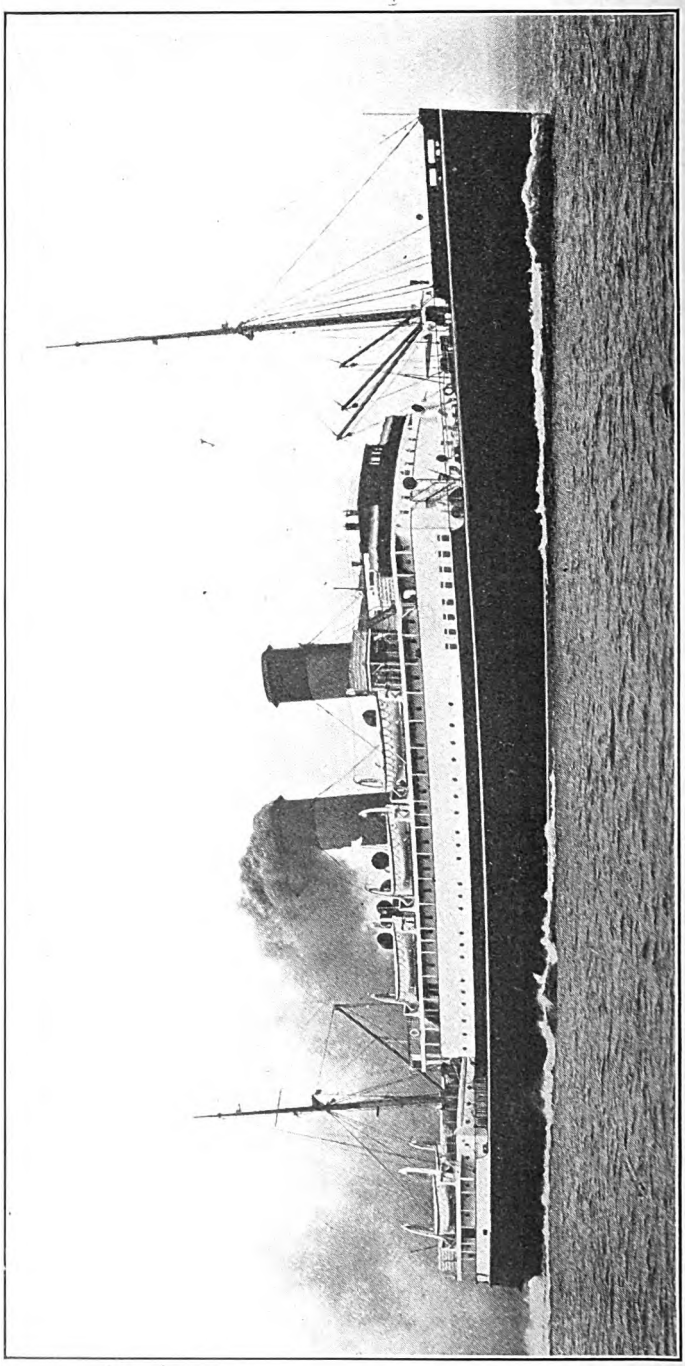
The dining saloon to seat 50 is panelled in polished mahogany; handsome window curtains, table lamps with golden-coloured silk shades on well-appointed dining tables, and Chippendale armchairs combine to produce a most agreeable effect. The room is 50 ft. by 18 ft., and is well lighted by 16 large windows.

Immediately adjoining the dining saloon are two lounges panelled in mahogany. These are luxuriously upholstered and provided with easy chairs and mahogany occasional tables. Attractive curtains to the arched headed windows with ornamental pelmets, and an oriental rug in the centre of the floor, complete a pair of charming rooms.

On the bridge deck four cabines-de-luxe are provided. Each room is panelled and painted in different shades, and is furnished with a wooden bedstead, dressing table, a sofa-seat (suitable also for berth), two chairs, a wardrobe recess, and a suitcase stand. A separate lavatory with marble-lined dado and tiled floor, having W.C. and wash-hand basin, is provided in each room, and a marble-lined bathroom is available, with direct access separate to each cabin. Walnut and mahogany furniture respectively for two suites give distinctive styles to each group. The colour schemes of upholstery, window curtains, and oriental rugs on the floor of each cabin-de-luxe have been tastefully executed.

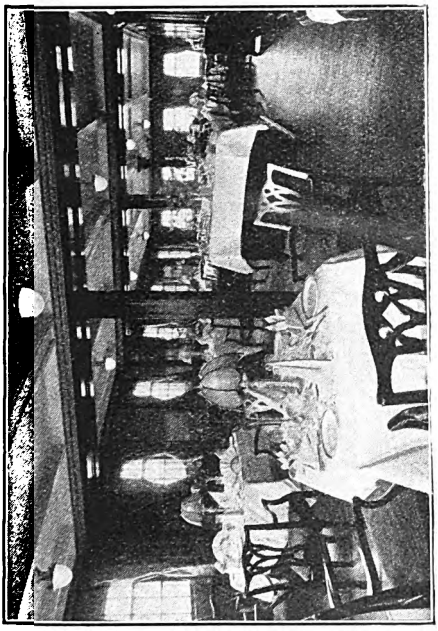
On the promenade deck is the smoke room, this being attractively designed in the Tudor style. The oak-beamed ceiling has a raised roof in the centre, lit by side windows, and at the ends windows glazed with leaded glass with heraldic motifs in colour; a carved oak beam below the windows gives a characteristic note of the period. The bar opening, the panelled doors, &c., further maintain the style of the period. The room is of pleasing shape, and the leather-covered recessed seats,

Digitized by Google

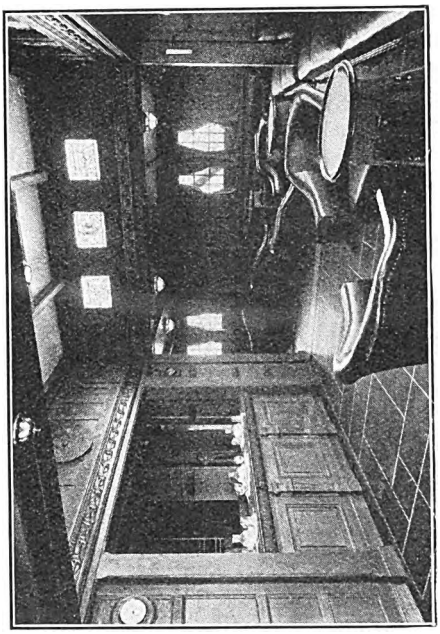


SS. "DUKE OF LANCASTER," HEYSHAM–BELFAST SERVICE, L.M.S.R.

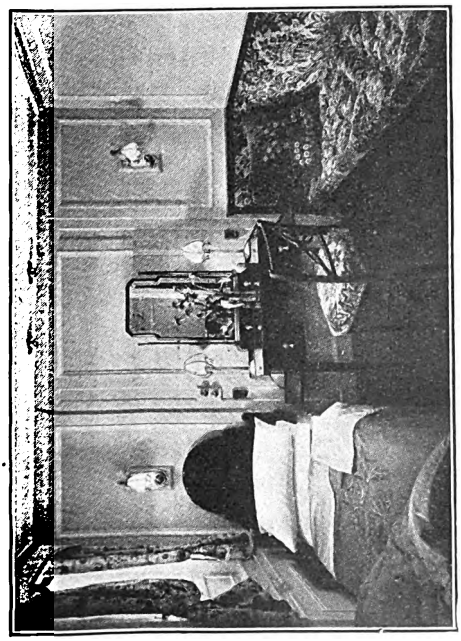
Digitized by Google



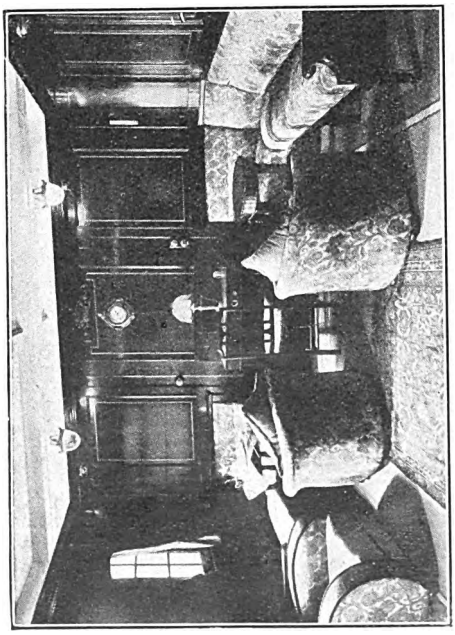
FIRST-CLASS DINING SALOON.



FIRST-CLASS SMOKE ROOM

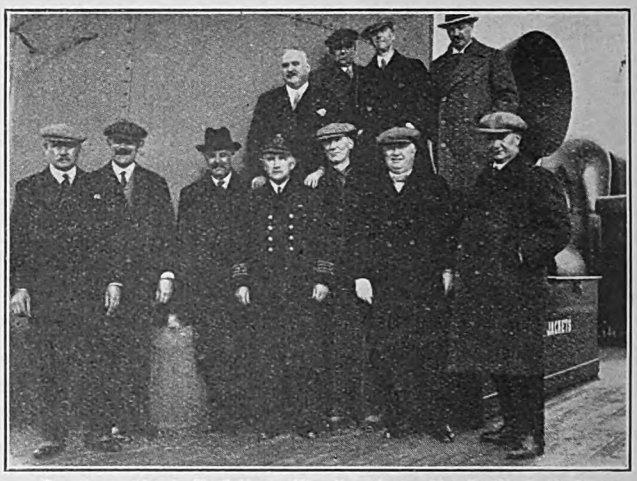


CABIN DE LUXE.



FIRST-CLASS LOUNGE.

Digitized by Google



Top Row.—Mr. J. H. Follows, Vice-President; Mr. R. W. Reid, Vice-President; Mr. F. G. Evans, Secretary; and Mr. Ashton Davies, General Superintendent (Passenger Commercial).

Front Row.—Capt. M. Beasley, Chief Marine Superintendent; Mr. F. H. Wedgwood, Director; Sir Josiah Stamp, Chairman and President; Capt. T. M. Steel; Mr. J. Quirey, Vice-President; Mr. S. H. Hunt, Vice-President; and Mr. R. C. Irwin, late Secretary.

Mr. G. H. Loftus Allen, Advertising and Publicity Officer (second from left); then Mr. F. Roberts, General Manager's Department; Mr. G. Morton, Assistant to Accountant (Audit); Mr. H. V. Mosley, Officer for New Works and Parliamentary Business; and Mr. E. Falconer, Assistant to Goods Operating Manager.

TWO GROUPS PHOTOGRAPHED ON BOARD THE "DUKE OF LANCASTER."

Taken on Inaugural Trips, April 17.

Digitized by Google

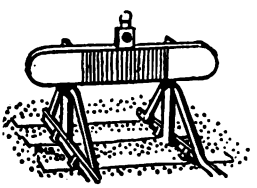
—	Mondays to Fridays.	Saturdays.
	p.m.	p.m.
LONDON (Euston) dep.	6 10	6 40
Rugby .. .. ,,	6 56	6 56
Leamington Spa ,,	5 36	5 36
Coventry .. ,,	6 20	6 20
Birmingham (New Street) ,,	5 50	5 50
Walsall.. .. ,,	5 27	5 27
Dudley .. .. ,,	5 35	5 35
Wolverhampton ,,	6 36	6 36
Stafford.. .. ,,	7 55	7 55
Crewe .. .. ,,	9 10	9 40
Warrington .. ,,	9 6	9 6
Wigan .. .. ,,	9 29	9 29
Liverpool (Exchange) ,,	9 10	9 10
Preston.. .. ,,	10 14	10 44
Morecambe (Promenade) ,,	10 51	11 21
Heysham .. arr.	11 1	11 33
,, .. dep.	11 50	11 50
	a.m.	a.m.
BELFAST .. arr.	6 30	6 30
	The Ulster Express.	The Ulster Express.

—	Mondays to Fridays.		Saturdays.	
	p.m.	p.m.	p.m.	p.m.
LONDON (St. Pancras) dep.	—	5 0	—	5 0
Kettering .. ,,	—	6 18	—	6 18
Leicester .. ,,	—	6 45	—	6 0
Nottingham .. ,,	—	7 22	—	7 22
Chesterfield .. ,,	—	8 7	8 7	—
Sheffield .. ,,	—	8 34	—	8 34
Leeds (Well'ton) ,,	—	9 30	—	9 30
Bradford (F. Sq.) ,,	—	9 0	—	9 0
Keighley .. ,,	—	9 55	—	9 55
Skipton .. ,,	—	10 10	—	10 10
Halifax.. .. ,,	7 50	—	7 50	—
Todmorden .. ,,	8 16	—	8 16	—
Rochdale .. ,,	8 33	—	8 33	—
Manchester(Vic.) ,,	9 5	—	9 5	—
Bolton .. .. ,,	9 27	—	9 27	—
Chorley .. ,,	9 44	—	9 44	—
Lancaster(Castle) ,,	10 26	—	10 36	—
Lancaster (Green Ayre) ,,	—	11 8	—	11 8
Morecambe (Promenade) ,,	10 40	—	10 50	—
Heysham .. arr.	10 50	11 25	11 0	11 25
Heysham .. dep.	11 50		11 50	
	a.m.		a.m.	
BELFAST .. arr.	6 30		6 30	

the sturdy furniture, chairs and tables, produce a feeling of snug comfort.

The inauguration of the re-arranged cross-Channel services was the occasion on Tuesday, April 17, of a luncheon in the Belfast Plaza, when Sir Josiah Stamp, Chairman, L.M.S.R., was the host of a large and representative company, which included the Prime Minister and members of the Northern Government, members of the Senate, and members of civic and other public bodies.

Sir Josiah Stamp, G.B.E., speaking of the ties between Britain and Northern Ireland, claimed that the L.M.S. played a very prominent part. They believed the step now taken would result in greater results from the combination of Fleetwood and Heysham services with benefit to all concerned. They had the advantage of the latest shipbuilding science, and in the choice of Heysham had secured an advantage in connection with the approach of the Channel, and they had much more room for expansion. So far as London was concerned, although there was a certain difference in mileage, there was no difference in time. They were confident of success in regard to scheduled time arrivals in Belfast. As a result of the new service, the mails, passengers, and cargo would reach Belfast an hour and a half earlier.

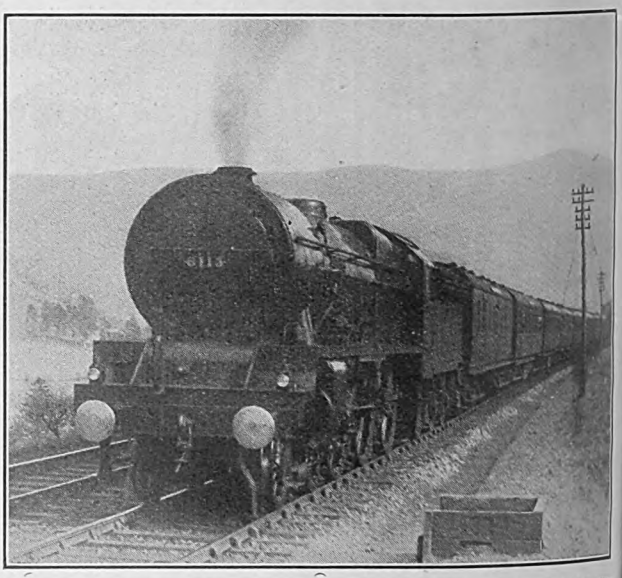


Digitized by Google

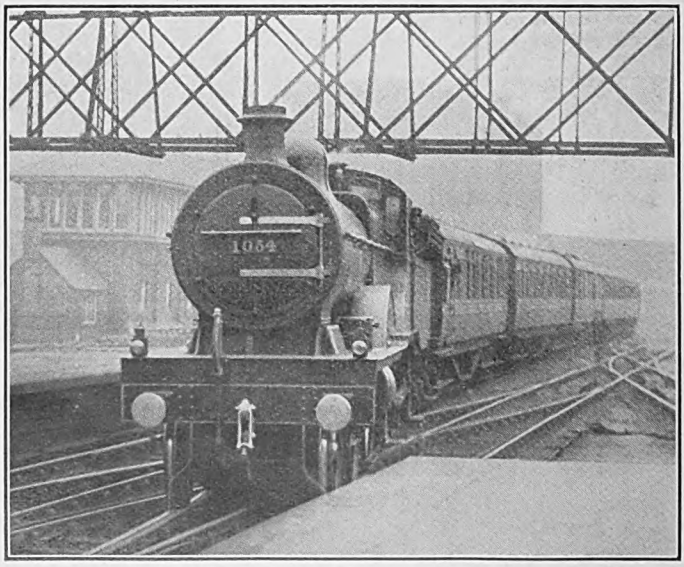
400-MILE NON-STOP RUNS BY "THE ROYAL SCOT" EXPRESSES, L.M.S.R.

On Friday, April 27, "The Royal Scot" express, which leaves Euston daily at 10 a.m. for Edinburgh and Glasgow, established two new world's records, in that one part ran from Euston to Edinburgh (399·7 miles), and the other from Euston to Glasgow (401·4 miles), in each case without a halt. Ordinarily, the train calls at Carlisle and Symington, for the separation of the Edinburgh and Glasgow portions; but to meet traffic requirements, the two parts were worked separately throughout, and it was decided to make non-stop runs from London to both places.

The fact that this new record was being made became known in Edinburgh and Glasgow later in the day, and the trains received a great welcome from enthusiasts who had gathered at Princes Street station, Edinburgh, and Central station, Glasgow, to witness their arrivals. Both trains ran to the schedule times throughout the journey.



GLASGOW PORTION, "THE ROYAL SCOT," ON ITS NON-STOP RUN FROM EUSTON, CLIMBING BEATTOCK SUMMIT.



[*J. H. Thomson.*

"THE ROYAL SCOT," L.M.S.R., ARRIVING AT EDINBURGH AFTER NON-STOP RUN FROM LONDON, APRIL 27.

The Edinburgh train was worked by No. 1054 of the L.M.S. 4-4-0 standard compound type and the Glasgow train by No. 6113 of "The Royal Scot" class. The former train was manned by Drivers G. W. Langdale and E. Ballantyne, with Fireman A. Bassett, and the latter by Drivers G. T. Stones and D. Gibson, with Fireman A. Pink.

Digitized by Google

Inaugural London (King's Cross)—Edinburgh (Waverley) Non-Stop Runs, L.N.E.R.

Photo.] [*Photopress.*

DOWN "FLYING SCOTSMAN" LEAVING KING'S CROSS.

PARTICULARS of the new non-stop runs from London (King's Cross) to Edinburgh (Waverley) which figure in the current time-table, both public and service, have already been given, and on Tuesday, May 1, the services were successfully inaugurated both ways.

A tremendous crowd assembled at King's Cross to witness the departure of the down train. The Lord Mayor of London, Sir Charles Batho, accompanied by Sir Ralph Wedgwood, Chief General Manager, and Mr. H. N. Gresley, Chief Mechanical Engineer, L.N.E.R., inspected the engine and conversed with the four enginemen. Addressing a Press Association representative, the Lord Mayor said: "I congratulate the London and North Eastern Railway Company on what is undoubtedly a wonderful achievement. It proves that British railways are not behind any others in the world; in fact, they can not only keep abreast of the times, but, I think, in the sphere of railway work they are always a little ahead of it. I congratulate the drivers and wish them the best of luck."

Similar scenes of enthusiasm were witnessed at the principal intermediate stations, notably York and Newcastle, while at Waverley station the arriving train was greeted with great enthusiasm. Mr. J. Calder, General Manager, Scotland, Mr. C. H. Stemp, Superintendent, and other officers of the Scottish Area, with Mr. A. C. Stamer, Chief Assistant Mechanical Engineer, welcomed the train. Mr. Calder presented the four enginemen with commemorative pocket books. They also received a monetary present subscribed by passengers during the journey.

The departure of the up train was also witnessed by a great crowd, Bailie Hay, deputising for the Lord Provost of Edinburgh, accompanied by Mr. Calder and other L.N.E.R. officers, giving it a formal "send-off." The train was met at King's Cross by another huge crowd, so great, indeed, that it was with difficulty that Mr. William Whitelaw, Chairman, L.N.E.R., and Sir Ralph Wedgwood and Lady Wedgwood, who were accompanied by Mr. W. M. Teasdale, Assistant General Manager, Mr. Alex. Wilson, Divisional General Manager, Southern Area, Mr. W. G. P. Maclure, Running Superintendent, Southern Area, and others, could get to the engine as it stopped. Mr. Whitelaw and Sir Ralph Wedgwood shook hands with the four enginemen, and the former presented them with commemorative pocket books. Speaking to a Press Association representative, Mr. Whitelaw said: "The run has been quite

Digitized by Google

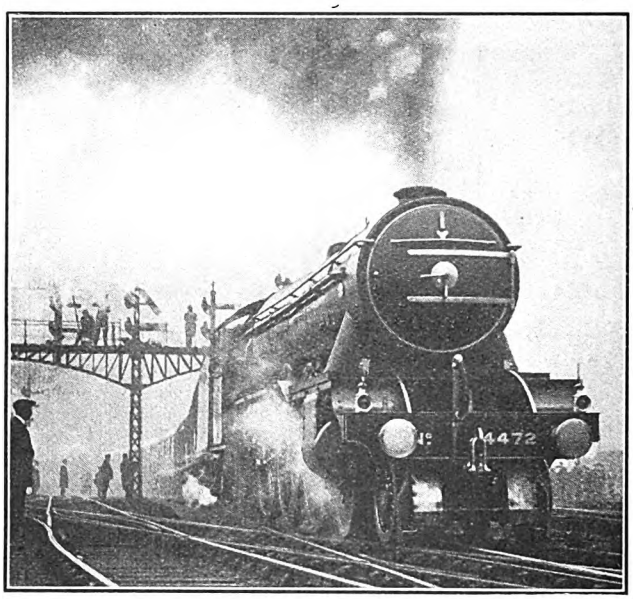


Photo.] [*Fox Photos.*

DOWN "FLYING SCOTSMAN" STARTING FROM KING'S CROSS ON MAY 1.

successful. There has been no shortage of water and no shortage of coal. We expect to have shortly on the line about 12 engines of similar capacity."

The following account of the down journey is supplied by our colleague, Mr. Chas. S. Lake, who travelled with the train :—

"The train left King's Cross punctually to time. Departure platform No. 10 was thronged with what is believed to be the largest gathering of the public ever known on any such occasion. The engine was No. 4472 *Flying Scotsman*, fitted with the new corridor tender. The train was made up entirely of new stock, including a triple articulated set of two restaurant cars (first and third class), and kitchen car, its tare weight being 386 tons. It was well filled throughout, and the load behind the tender, including passengers and luggage, may safely be computed at 400 tons.

"No intermediate stop occurred *en route*, and the train arrived at Edinburgh, Waverley, at 6.3 p.m., 12 min. before schedule time. Owing to permanent-way checks in the early part of the run, 2 min. had been lost by the time New Barnet was passed, but this was made up before reaching Hatfield. Permanent-way cautions accounted for 9 min. in all in the course of the run, so that with the 12 min. improvement on schedule, the engine gained 21 min. on its timing. No signal slacks were experienced.

"The greatest interest was shown throughout the trip, not only by railway employees but by the public. The platforms at all the principal stations, and particularly at Doncaster, York and Newcastle, were crowded with interested onlookers as the train passed through.

"Driver A. Pibworth and Fireman W. Goddard, of King's Cross, were in charge of the engine from London to Tollerton, at which point Driver T. Blades and Fireman W. Morris, of Gateshead, relieved them. Locomotive Inspector Bramall was also present on the footplate. No difficulty of any kind was experienced with the engine, both coal and water supplies proving ample. It was estimated that rather more than 2 tons of coal remained on the tender when Edinburgh was reached. Water was picked up at six points *en route*.

"The writer had an opportunity of conversing with the relief (Gateshead) enginemen before they went on duty and the London men after they came off the footplate. Driver Pibworth reported an excellent run from King's Cross to Tollerton, the engine being in fine trim. It is evident that the new arrangements are very popular with the men, whilst their opinion of Mr. Gresley's Pacific type engines is a very favourable one.

"Later, by Mr. Gresley's courtesy, the writer was permitted to travel on the footplate for a part of the way between Berwick and Edinburgh, in company with that gentleman. Passing through the tender corridor at 60 m.p.h. presented no difficulties, and the writer was greatly impressed by the smooth riding qualities of the engine, its roomy well-arranged footplate, accessibility of cab fittings and controls, and the excellent look-out which, when the large size of the boiler is remembered, is exceptionally good. Although then nearing the end of the run, the driver and fireman seemed as fresh

Digitized by Google

and certainly as clean as when they went on duty. The steam pressure gauge consistently registered 156 lb. per sq. in. with light firing, the engine being notched to 30 per cent. cut-off.

"It was reported that the hairdressing saloon was well patronised during the course of the run, whilst the newspaper and book service was also much appreciated. A collection among the passengers for the enginemen realised £10.

"Passing times :—Peterborough, 11.24 a.m.; Grantham, 11.58 a.m.; Doncaster, 12.54; York, 1.37 p.m.; Newcastle, 3.22 p.m.; Berwick, 4.50 p.m.; Edinburgh arrive 6.3 p.m. At Newcastle the train passed through on No. 8 platform road. This is, it is believed, the first occasion on which an express in regular service has been booked to pass Newcastle without stopping. The up "Flying Scotsman" (Edinburgh to London non-stop) was met near Pilmoor Junction (204¼ miles from King's Cross) at 2.2 p.m. Generally speaking, the journey was noteworthy for steadiness of running at an even average speed. The new coaching stock proved in every way satisfactory."

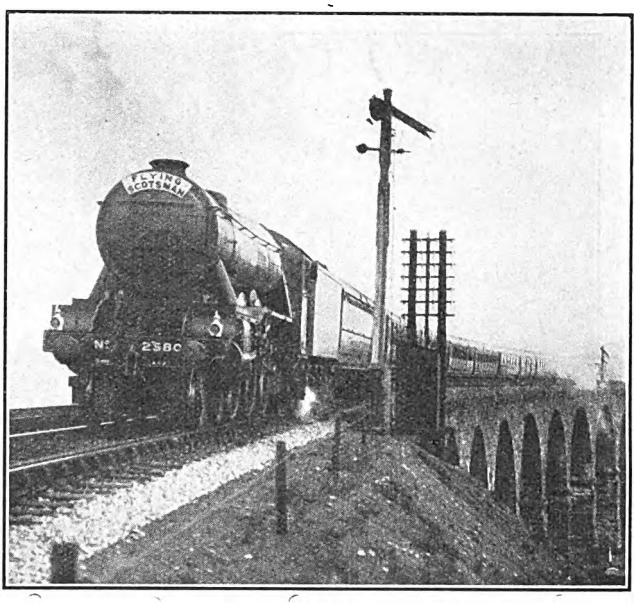


Photo.] [*Topical.*

UP "FLYING SCOTSMAN" LEAVING ROYAL BORDER BRIDGE, BERWICK. LOCOMOTIVE NO. 2580 "SHOTOVER."

The up train, worked by No. 2580 *Shotover*, fitted with a 220-lb. pressure boiler as well as with a corridor tender, was worked by Driver T. Henderson and Fireman R. McKenzie (Edinburgh) and Driver J. Day and Fireman F. Gray (King's Cross). It passed Berwick at 11.10 a.m., Newcastle at 12.40 p.m. York 2.18 p.m., Doncaster 2.58 p.m., and Grantham at 4.4 p.m., reached King's Cross at 6.12½ p.m.

We supplement the foregoing by reference to the special features incorporated in the coaching sets used, notably the inclusion of a section constituting a fully-equipped hairdressing saloon in charge of a competent hairdresser and a ladies' retiring room, in the care of an experienced attendant; and the arrangements whereby a travelling newsman (from W. H. Smith & Son Ltd.) is able to supply newspapers, periodicals and the latest books, including those published for the first time on the day of travel.

The ladies' retiring room is at one end of the coach, with private lavatory adjoining, and is equipped with dressing-table wash-basin, chair, mirror, and cabinets and drawers to enable the attendant to supply perfumery, toilet articles, &c. Next to this, but open only to the corridor, is the hairdressing saloon, where also the attendant has all necessary equipment and a cabinet and cupboard for requisites and articles for sale. Adjoining is a one-sided compartment designed to serve as a waiting room. This opens to the corridor only, so that a customer receiving attention in the hairdressing saloon is not disturbed, and, in the case of ladies, has full privacy. Notices on the respective doors indicate whether either section is "engaged" at the moment.

The waiting room, which seats four, ensures that passengers will not have to return to their compartments if the hairdresser is engaged. The hairdressing saloon and ladies' retiring room are available to all passengers on the train, whether travelling first or third, the train being vestibuled and having corridors throughout.

The travelling newsman is provided

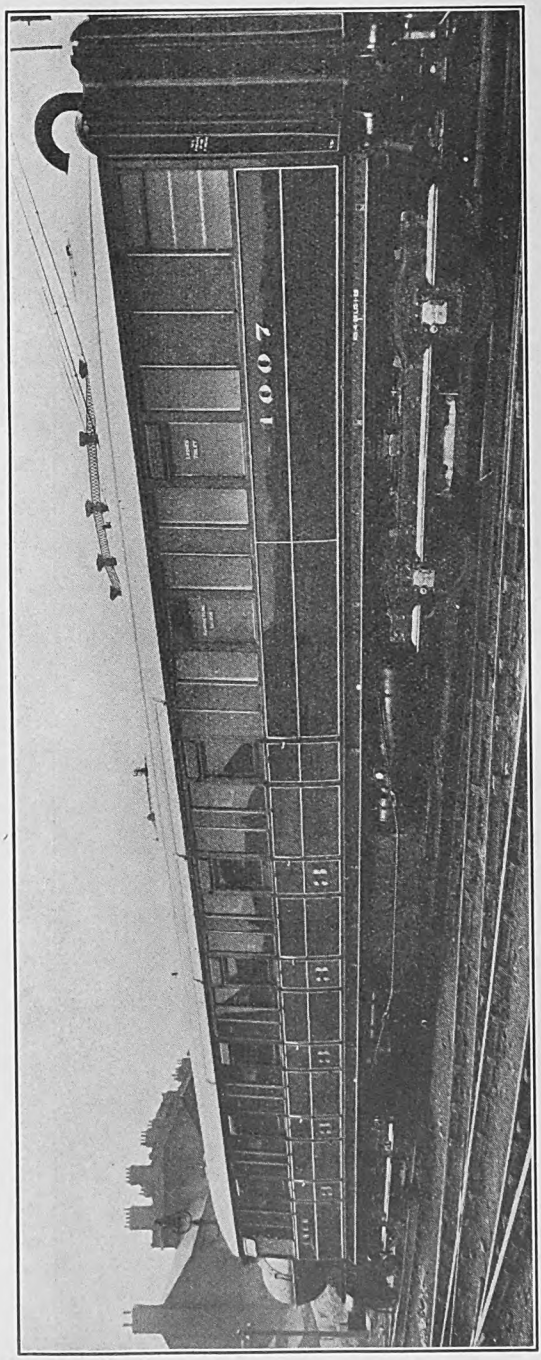
Digitized by Google

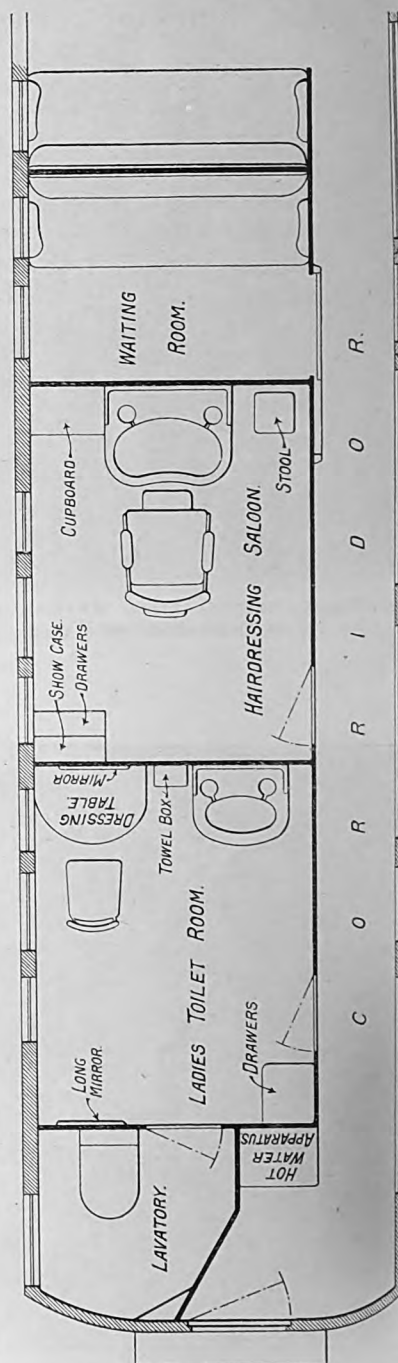
Digitized by Google

SIR CHARLES BATHO, LORD MAYOR OF LONDON, MR. H. N. GRESLEY, DRIVER PIBWORTH AND MR. W. M. TEASDALE AT KING'S CROSS. [*Keystone.*

HAIRDRESSER, LADY ATTENDANT AND NEWSMEN WORKING ON UP AND DOWN "FLYING SCOTSMAN" EXPRESSES. [*Photopress.*

Digitized by Google





GENERAL VIEW AND PLAN SHOWING ARRANGEMENT OF HAIRDRESSING SALOON AND LADIES' TOILET ROOM.

Digitized by Google

with a basket specially constructed to enable him to move freely along the corridors.

Other items of interest in regard to the train are that the kitchen is all-electric, ensuring cleanliness and hygienic conditions; individual seats can be booked beforehand, or compartments reserved (a uniformed attendant is specially allocated to direct passengers to reserved accommodation); and an attendant in uniform travels with the train.

The standard make-up is as follows: 4-6-2 locomotive with corridor tender; brake van and three compartments (first reserved for resting enginemen); third class; first and third class; third-class restaurant car; kitchen car; first-class restaurant car; first class; hairdressing saloon and ladies' retiring room, and five third-class compartments; third class; third class; brake van. The length of the train (including the engine) exceeds 700 ft., and the weight 500 tons.

The following drivers and firemen will take their turn in working the non-stop trains from London to Edinburgh, and *vice versa*.

Gateshead Enginemen.

Driver T. Blades. Fireman W. Morris.
Driver H. Pennington. Fireman J. Ridley.
Driver J. Gascoigne. Fireman J. J. Williams.
Driver J. W. Halford. Fireman J. F. Cairn.
Driver J. G. Smith. Fireman J. Bambra.
Driver J. G. Eltringham. Fireman J. Slinger.

Scottish Enginemen.

Driver T. Henderson. Fireman R. McKenzie.
Driver T. Roper. Fireman J. Todd.
Driver R. Sheddon. Fireman L. Taylor.
Driver T. Smith. Fireman J. Redpath.

King's Cross Enginemen.

Driver A. Pibworth. Fireman W. T. Goddard.
Driver B. Glasgow. Fireman A. Austin.
Driver J. Day. Fireman F. Gray.
Driver H. Miles. Fireman W. J. Bridle.

The hairdressers are Messrs. B. Morris & Sons, while W. H. Smith & Son are responsible for the newsmen.

"BLUE TRAIN," CALAIS-PARIS-VENTIMIGLIA, PASSING GOLFE JUAN.

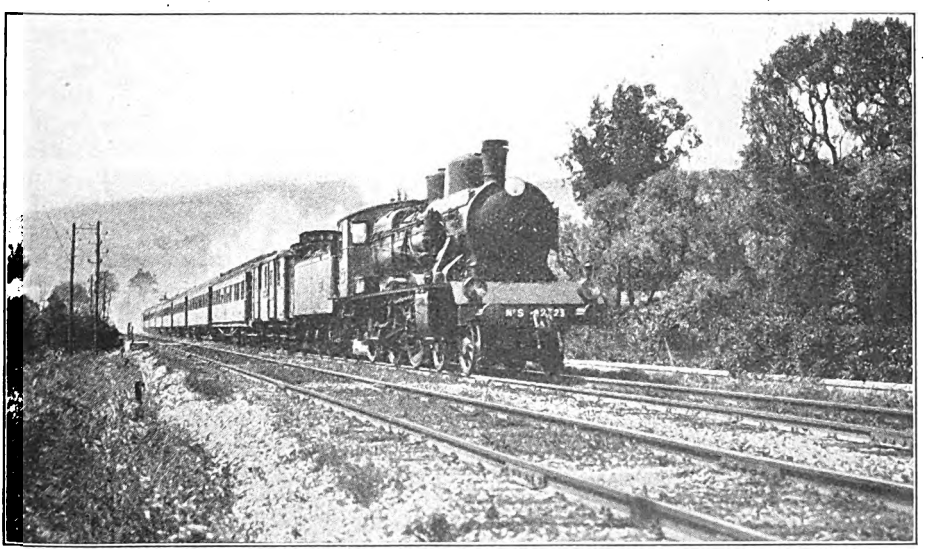


Photo.] P.L.M. 4-6-0 LOCOMOTIVE. [*E. A. Gurney Smith.*

Digitized by Google

British Locomotive Practice and Performance.

By CECIL J. ALLEN,
M.Inst.T., A.I.Loco.E.

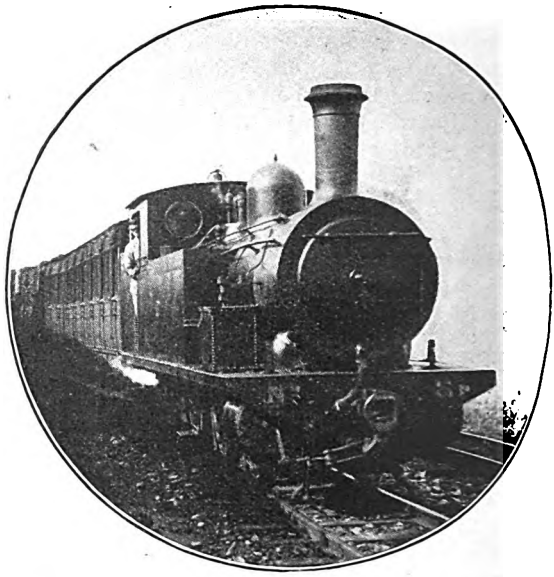


Photo.] [*R. Murphy.*

CORK-MONKSTOWN TRAIN, GREAT SOUTHERN RAILWAYS, IRELAND.

C.B. & P. 2-4-2 locomotive No. 6 (3-ft. gauge).

MUCH scientific investigation is being directed at the present time towards the technical improvement of the steam locomotive. Experience has proved that it is idle to expect any extensive electrification of railways in our own time, except where conditions are particularly favourable. Even in such a country as Switzerland, with abundant supplies of water-power, and lengthy and steep gradients up the mountain valleys over which electric working renders possible substantial economies, the burden of capital cost in providing the Swiss equipment has been so enormous that only an increase of traffic over that carried in the best pre-war year of 1913 has met the interest charges on this capital, and left a residuum of economy in favour of electricity. For similar reasons, the most lengthy continuous electrification scheme in the world—that which equipped for electric working the 440 miles of the Chicago, Milwaukee and St. Paul over three mountain ranges between Harlowton and Avery—ultimately brought its parent company into the hands of a receiver. The conditions in which electrification of railways is a commercially sound proposition are, indeed, very narrowly limited, and it is doubtless for this reason that closer attention than previously is now being paid to improvement in the efficiency of the steam locomotive.

What has been done in this direction in our own country is familiar enough. The Great Western Railway, a quarter of a century ago, set the fashion of considerably higher working pressures than those employed by their neighbours, coupled with cylinders of small diameter in proportion to their stroke, and lengthy valve-travels, to permit of habitual working in short cut-offs, with fully-open regulators. Until recently, other railways have been in no hurry to follow the Great Western example, but the lessons of the locomotive exchanges of 1925 and 1926, in which Great Western "Castle" class engines were involved, were too striking to be ignored. To-day, working pressures of between 200 and 250 lb. per square inch are becoming common enough on the locomotives of all four British groups. Great progress has also been made in the mechanical perfection of British locomotives. Indeed, it is doubtful whether the figures

Digitized by Google

of 2·1 lb. of coal per I.H.P.-hour achieved in test conditions by the G.W.R. engine *Caldicot Castle*, and the even lower 1·9 lb. of the more recently-designed L.M.S. *Royal Scot*, are likely to be surpassed by any future steam locomotive of traditional design.

But when it comes to breaking away from traditional designs, in this search for higher efficiency, one is bound to admit that Great Britain does not lead the world. Of this fact I had a forcible reminder in reading the April issue of our contemporary *The Locomotive*. Three important steam locomotive developments are illustrated and described, and in none of them has Great Britain any share. There are first the two externally hideous but extremely efficient freight engines *Horatio Allen* and *John B. Jervis* of the Delaware and Hudson Railway of the U.S.A. The former carries a working pressure of 350 lb. and the latter of 400 lb. to the square inch. In both cases, water-tube fireboxes are provided for the generation of steam at this high figure. The *Horatio Allen* has been running for some time past, and under test conditions, working on a continuous rising grade of 1 in 200 with heavy freight trains, has shown a boiler efficiency of 76 per cent., a machine efficiency of 94 per cent., an overall thermal efficiency of 8·02 per cent. (an exceptionally high figure) and a coal consumption of 2·2 lb. per I.H.P.-hour. The *John B. Jervis*, designed and improved with the experience gained from the working of the former engine, should make a better showing than this. It must be emphasised that these fuel results were obtained with the average coal in use on American locomotives, which is of considerably lower steaming power than our British coal, and, indeed, caused some trouble in steaming to our Great Western engine, *King George V*, when running trials on the Baltimore and Ohio Railroad after the Baltimore Exhibition.

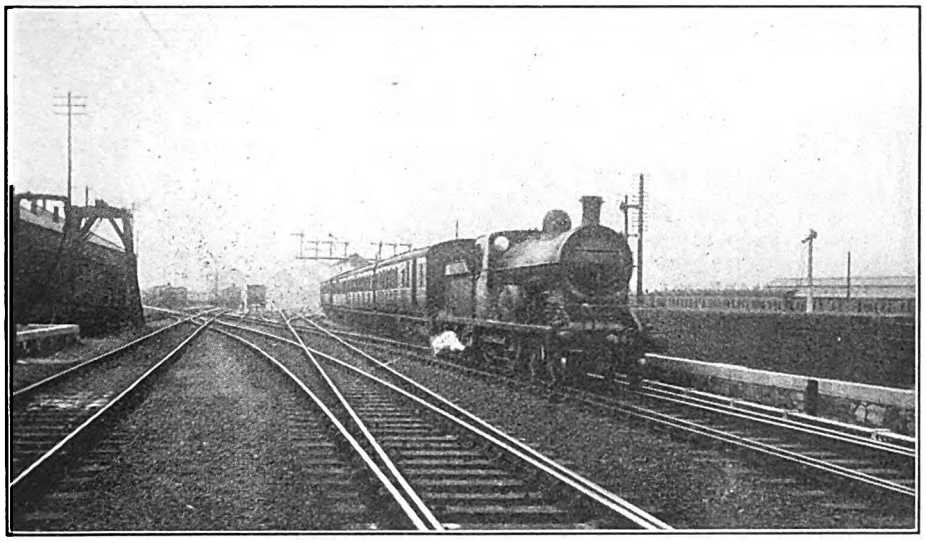


Photo.] [*J. Macartney Robbins.*

DUBLIN-BELFAST RESTAURANT CAR EXPRESS LEAVING AMIENS STREET.

Great Northern (Ireland) 4-4-0 No. 191.

Next, *The Locomotive* introduces us to an even more remarkable high-pressure engine, built by the Swiss Locomotive & Machine Company, of Winterthur. In this case, a pressure of no less than 850 lb. per square inch has been adopted. It is a tribute to the thoroughness of Swiss methods that the engine in question was tested on the works testing plant over a space of twelve months before it was finally completed and put on the road. This is a considerably smaller locomotive than those to which reference has been made previously, being of the 2-6-2 tank

Digitized by Google

type. A water-tube boiler of novel design is employed, and is fed with water practically at boiling point; the steam is used in three small cylinders of "uniflow" type, admission being controlled by poppet valves. As tested against an ordinary two-cylinder 2-6-0 Swiss Federal locomotive of comparable weight and power, the high-pressure engine has shown some startling economies, amounting to between 35 and 40 per cent. coal saving, and between 47 and 55 per cent. curtailment of water consumption. In this case, traditional steam locomotive design has been broken away from in almost every material particular.

by low-pressure steam direct from the boiler itself, which is similar in design to an ordinary locomotive boiler.

Yet further, the April issue of *The Locomotive* goes in detail into recent American developments in the provision of auxiliary power for locomotives. The fact needs no stress that the steam locomotive has to develop its maximum tractive effort when starting away from rest, in order to overcome the static friction in the journals of the axle-boxes throughout the length of its train. If auxiliary power can be provided at the moment of starting, therefore, the size and power of a locomotive needed to perform any given task of haul-

Photo.] [*S. B. Jackson.*

BELFAST-DUBLIN RESTAURANT CAR EXPRESS PASSING BALMORAL.

Great Northern (Ireland) 4-4-0 No. 172.

Another engine working at very high pressure, initially at about the same figure as that employed on the Swiss engine just mentioned, has been designed and built by the German Henschel Company, of Cassel, and has been running successfully over the Prussian State lines for some time past. In this machine the high pressure steam is generated by an ingenious water circulating arrangement, in a stout drum located above a water-tube firebox, and this steam is employed in compound cylinders wherein the supply of the receiver intermediate between high and low-pressure cylinders is augmented

age can be reduced, provided that the auxiliary does not prove a constant drain on the boiler steam supply, nor oppose frictional resistance to motion when the engine gets into speed. This is precisely the purpose of the American "booster," which fulfils these conditions, and whose use is spreading as rapidly over the railways of the United States as did that of the superheater over the railways of Great Britain, when introduced from Germany in the early years of the present century. It may be argued that the application of the booster is a simple matter on the American locomotive, as the large fire-

Digitized by Google

boxes necessarily employed for the combustion of American fuel entail the provision of idle wheels behind the coupled wheels, at the trailing end of the engine. Engines of such types are comparatively rare in Great Britain, and the only use of booster gear in this country is confined to one 4-4-2 and two 2-8-2 locomotives of the London & North Eastern Railway, all fitted with wide fireboxes carried by trailing idle wheels.

But the fitting of booster gear is now being extended in America to tenders. The Bethlehem Steel Company has perfected an arrangement whereby the wheels of one or both bogies of the American bogie tender are operated by a small two-cylinder auxiliary engine, which can be cut completely out of use when the locomotive and train have got into speed. The *John B. Jervis*, of the Delaware and Hudson, already mentioned, is fitted with a twelve-wheeled tender of this character, designed for the performance of lengthy runs with heavy freight trains without stops for water or fuel The capacity of this monster vehicle is, indeed, 18 tons of coal and 16,000 gallons of water, and the weight when fully loaded, 135 tons. In the United States, where a gross freight tonnage of, roughly, eleven hundred million tons is moved annually over an average distance of 300 miles per consignment, full use is made of the tractive powers of such colossal machines as these.

It is worth remembering that the economy of railway operation is likely to rise in proportion to the load operated by one locomotive and one crew. On the Virginian Railways of America, where twelve-wheeled coal wagons having each a capacity of 107 British tons are in use, a train of 111 wagons, with a gross weight of 15,400 tons, was once experimentally worked by an unassisted Mallet compound locomotive of the 2-10-0 + 0-10-2 type over the 130 miles from Victoria to Sewall's Point. To move a corresponding load of British coal would have required the services of 573 British 20-ton coal wagons, and as to locomotives—probably more than ten of the most powerful types that we have at present in use. With all the extenuating circumstances that we may plead in this country, arising out of a restricted construction gauge and the British operating practice of small consignments and short hauls, from the standpoint of economics such a comparison as this demands consideration.

Yet on some British railways the weight of freight trains appears in course of reduc-

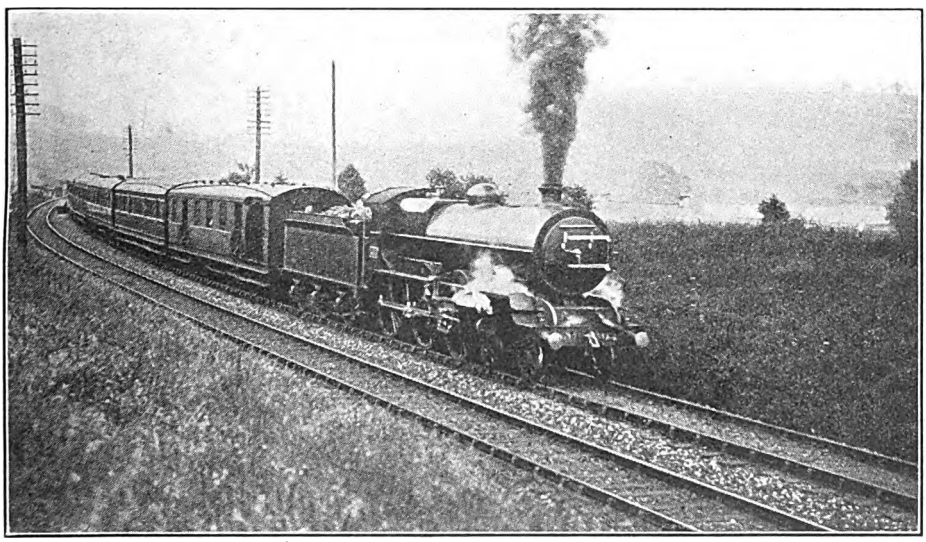


Photo.] [*Rex Murphy.*

UP ENGLISH MAIL ON 1 IN 70 GRADE FROM CORK TUNNEL.

Great Southern (Ireland) 4-cylinder 4-6-0 No. 403.

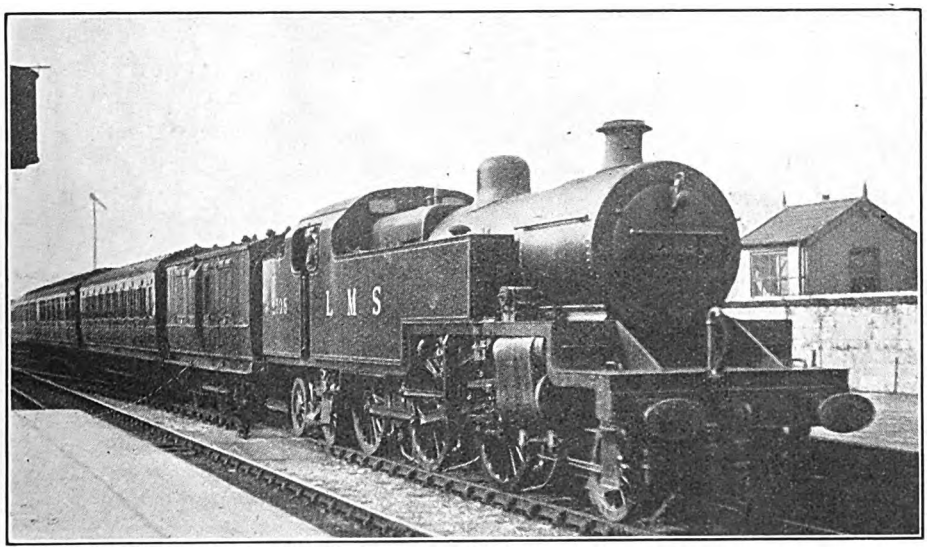
Digitized by Google

Digitized by Google

savings have to be offset against the higher initial cost of the motor equipment, interest on which must be taken into account.

It is felt on many hands, however, that with some such propulsion as this there may come the most effective reply to road competition. The only comparable development in Great Britain, in the matter of steam traction, has been the remarkably efficient Sentinel engine and boiler working at 275 lb. per sq. in pressure, which has been applied to the Sentinel-Cammell motor-coach units. There has been a break from traditional practice, also, in the light construction of the vehicles themselves, and the firms concerned are to be congratulated in having produced the only real novelty of British origin which has distinguished our locomotive practice for a number of years past—other than the application of the Kitson-Still patents to the unique combination of steam and internal-combustion locomotive produced recently by Messrs. Kitson & Co., and now in course of trial on the L.N.E.R. system. This trial is in too early a stage, however, for any pronouncement to be made as to the success of the engine or the reverse. It is to be noted that all these developments come from outside the railways, rather than from the railway designers themselves, though the same may also be said of the Swiss, French, Swedish and American innovations previously mentioned.

Much more might be said on this vexed question, but the time has come to turn to locomotive performance. I am reminded by a correspondent that 7½ years have elapsed since last I made extended reference to the locomotive work of Irish railways. In this particular case I could, of course, plead the title of these articles as my defence; but, as I have recently enjoyed some interesting journeys over the Great Northern Railway of Ireland, there is no occasion so to do. Most entertaining of all was a footplate trip which I was privileged to make on the Limited Mail from Belfast to Dublin, by kind invitation of Mr. G. T. Glover, the Chief Mechanical Engineer of the line, and with this I will begin.



Photo] [*P. Ransome-Wallis.*

TRAIN FROM NOTTINGHAM ENTERING WORKSOP STATION.

New L.M.S.R. 2-6-4T No. 2308.

Actually the journey was made in the same week as that on *King George II* of the Great Western Railway, described last December, and the contrast between the two trips was striking. It was a dirty evening in October when I joined Driver Lisk and Fireman Carlisle on the footplate of 4-4-0 No. 191; heavy rain

Digitized by Google

was now thinning down to a kind of Scotch mist, and dusk was falling. We had behind us seven eight-wheelers of the fine modern corridor stock of the Great Northern, weighing empty 220 tons and full about 235 tons. Even with so modest a train as this, the timings leave nothing to spare—30 minutes for the 24·9 miles from Belfast to Portadown, of which distance the first two-thirds is mainly adverse; 40 minutes for the 33·5 miles thence to Dundalk, a really astonishing schedule, in that it includes the 8½-climb past Goraghwood, 5¾ miles of which are at between 1 in 100 and 120; 27 minutes for the sharply-undulating 22·5 miles from Dundalk to Drogheda; and 36 min. over the final 31·7 miles into Dublin. The average point-to-point speeds are thus 49·8, 50·3, 50·0 and 52·9 m.p.h., and the total running time for the 112½ miles is 133 minutes.

On being given the "right-away," Driver Lisk opened the regulator gently at first, with cut-off at the maximum of 75 per cent., as the engine inclined to slip on the greasy rails; but very soon I was pleased to see the regulator handle go hard over, and there it remained throughout the run, cut-off having been brought back to 30 per cent. by the completion of the first mile. The engine was due for shops, and, owing to the confused noises on the footplate and the increasing darkness, it was difficult at first to get any exact estimate of the speed; but later on I succeeded in verifying it fairly accurately from the rail-joints. The rise out of Belfast is 1 in 200 at its steepest, but there is a long level stretch from Lisburn to near Moira, on which we first attained the mile-a-minute rate. At mile-post 96, after 2½ miles up at 1 in 148–248, we were doing 53½ m.p.h.; here the cut-off was shortened to 25 per cent. for the falling grades into Portadown. Nevertheless, we accelerated rapidly to a maximum rate of 75 m.p.h., and thus succeeded in completing the 25 miles in 29 min. 5 sec., gaining all but a minute on schedule.

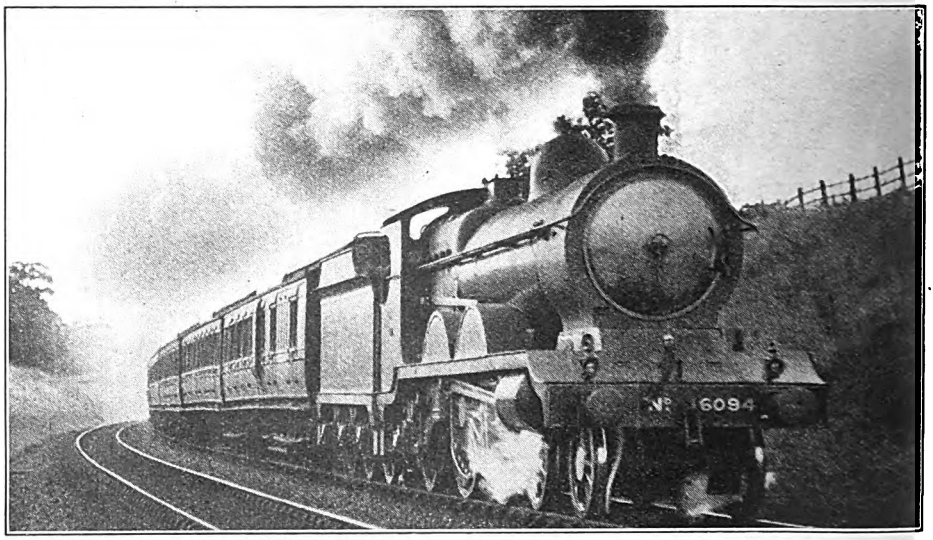


Photo.] [*W. Leslie Good.*

NEWCASTLE-SWANSEA EXPRESS, L.N.E. & G.W. RAILWAYS, NEAR RUGBY.
L.N.E.R. (G.C.) 4-4-2 No. 6094.

With the best of locomotive work it would be difficult to gain much on the next section. Once again the regulator handle went right over to full open immediately after starting, and cut-off was quickly brought back to 25 per cent. for the undulating but fairly level 13½ miles to mile-post 74. Steam was shut off for the Poyntzpass curves, but for all that, the 10·1 miles from Tanderagee to Goraghwood were covered in 10 min. 45 sec. Here the rear coach, destined for Warren-

Digitized by Google

point, was slipped, and with load lightened to 205 tons we tackled in earnest the formidable ascent. Cut-off was finally advanced to 35 per cent., and we forged steadily up through the mountains, mostly at round about the 40-miles-an-hour rate, and never at less than 38 an hour; in fact, the 6·4 miles from Goraghwood, a good two miles up the bank, to mile-post 65½—the summit—were covered in 8 min. 55 sec., at an average rate of 43·2 m.p.h. Once over the top, Driver Lisk brought his cut-off back to 25, and partly closed his regulator, for a truly tempestuous descent to Dundalk. I rarely remember being so thoroughly thrilled on the footplate. The engine heaved and surged as though alive; the mist and the blackness were alike impenetrable; and there is no question that we touched 80 miles an hour. In fact, the 7½ miles from Adavoyle to milepost 55 were covered in 6 min. 5 sec., at an average of 73·8 m.p.h. So we completed the 33·5 miles from Portadown in 39 min. 10 sec., at an average speed of 51·3 m.p.h., Adavoyle summit notwithstanding.

At Dundalk I said good-bye to No. 191 and her crew, and mounted No. 170, another 4-4-0 recently rebuilt by Mr. Glover with a boiler carrying 200 lb. steam pressure; Driver Reilly and Fireman Clark were in charge. A couple of corridor coaches were added to our load, bringing it up to the substantial figure of 265 tons all found. As compared with No. 191, which, as previously mentioned, was just due for shops, the riding of No. 170 was delightful; in all my now extensive footplate experience I seldom remember a smoother or a quieter footplate journey, especially on a 4-4-0 engine. Once again full regulator was throughout the order of the going; and the general position of the cut-off was about 2½ of the 7 notches in forward gear, which I am given to understand corresponds to about 25 per cent. Speed varied between 64 m.p.h., after the descent from mile-post 52, to 56½ at the end of the Castlebellingham level: the five miles of Dunleer bank, at 1 in 198, brought the rate down to 45 an hour; on this section we lost 35 sec. on schedule time.

Exact time was kept from Drogheda into Dublin; there were no high maximum speeds over this level course, but the 23·4 miles from Laytown to Raheny were reeled off in 23½ min., at an average throughout of practically 60 m.p.h. Pressure was maintained nicely at the 200-lb. mark throughout the journey, except

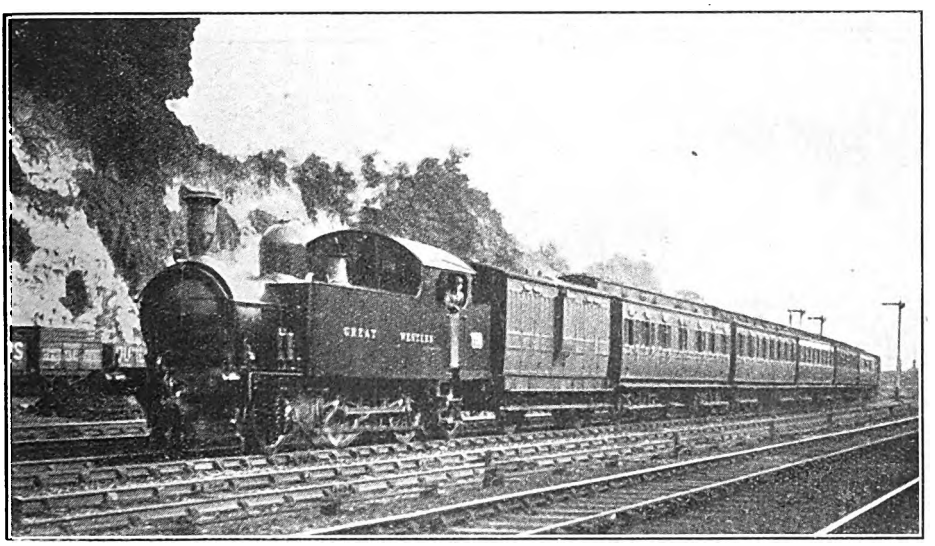


Photo.] [*Henry L. Salmon.*

G.W.R. LOCAL TRAIN NEAR PANGBOURNE.

Rebuilt 2-4-2T No. 3593 (formerly 2-4-0T).

Digitized by Google

beyond Skerries, after which it was allowed to fall, the fire not needing to be touched again. The journey was to me a forcible reminder—made as it was in the midst of footplate trips on 4-6-0 and 4-6-2 locomotives of far greater size and power—of what is still being done with success, and no lack of economy, by 4-4-0 locomotives in these islands, where running conditions permit. In this respect the journey just described forms a sequel of no small interest to the runs over the Great Central section of the London and North Eastern Railway, described last month, in which 4-4-0 locomotives, with very similar loads, were chiefly concerned.

certain of these runs, and my remaining experiences on my own recent visit, I will conclude my notes. First, then, several south-bound journeys from Belfast to Dublin. In this table my own footplate run occupies the first column, followed by a run on the "Limited Mail" with practically the same load; then comes a run of mine on the 10.15 a.m. and one of my correspondent's trips on the 2.30 p.m. from Belfast.

On the second "Limited Mail" trip No. 190 fell a minute behind No. 191 from Belfast to Portadown, but the position was exactly reversed from Portadown to Adavoyle Summit, after which the

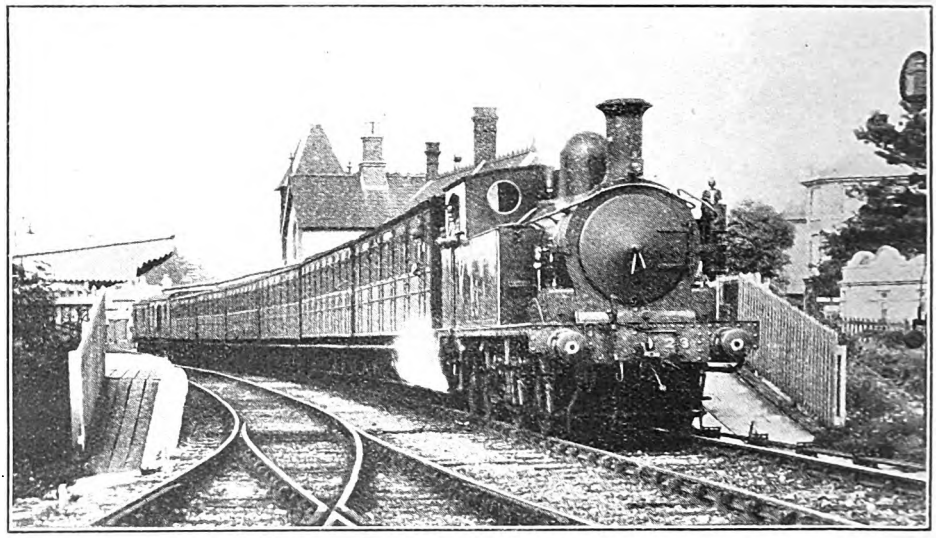


Photo.] VENTNOR TRAIN AT SHANKLIN. [*O. J. Morris.*

0-4-4T No. W23 and train of ex-Metropolitan 8-wheeled coaches.

I had been keeping in reserve a number of Irish runs, timed by correspondents, for use when occasion permitted, but in the domestic upheavals associated with the spring season, these have been temporarily mislaid. At the last moment, however, the friend whose remarks prefaced this month's performance sent a number of carefully-timed logs, chiefly over the Great Northern line, concerning which the only criticism that I would venture to make is that in comparison with the speeds of my own runs, some of my friend's maximum and minimum speeds appear a little on the high side, in proportion to the times achieved. With

downhill travelling was so excessively cautious as to lose 2¼ min. on the latter's time, and ½ min. on schedule. Speeds were 50 m.p.h. at Lisburn and 60 at Moira, but the minimum at mile-post 96 was not noted; maximum before Portadown was 70 m.p.h. Three-quarters of a minute in the gain on the previous times out of Portadown were in a much smarter start to Scarva, after which the times were fairly level. Speeds were 64 m.p.h. at Tanderagee, 55 at Scarva, 64 at the bottom of the dip before Goraghwood, 47½ at Bessbrook, and 36 at the summit, after which no higher speed was attained than 67 an hour on the descent to

Digitized by Google

Dundalk, as against the 80 of No. 191's journey.

There was some smart running on my 10.15 a.m. trip; the gain of 1½ min. between Goraghwood and Dundalk was, in particular, good. We gradually accelerated out of Belfast, passing Dunmurry at 50½ m.p.h., Lisburn at 59, Moira at 66, and mile-post 96 at 54, after which we touched 74 an hour in descending to Portadown. Stops at Tanderagee and Scarva break up the next stretch of the run; from Goraghwood start we attained 26 and 36½ m.p.h. at the end of the first two miles of the climbing, the speeds at the conclusion of subsequent miles being 34, 32, 31½, 32, and 33 m.p.h. on breasting mile-post 65½. A swift descent was then made to Dundalk, with a maximum of 74 m.p.h. On the 2.30 p.m. south-bound train No. 172 had a corresponding load, and lost 2½ min. to Portadown, with speeds of only 59 m.p.h. at Maze, 45 at mile-post 96, and 64 before the stop. But ample amends were made afterwards, by gains of a minute to Goraghwood, and 2¼ min. from there on to Dundalk. Speeds were 64 m.p.h. at Tanderagee and before Goraghwood, an attained rate of 30 m.p.h. at Bessbrook and 34 m.p.h. at the summit, and 71½ at Mount Pleasant, before slowing for Dundalk.

In the opposite direction No. 113, on the 3 p.m. from Dublin to Belfast, lost 1½ min. from Dundalk to Goraghwood, and another 1¼ min. between Portadown and Belfast, but gained just over a minute on the intermediate stage. Out of Dundalk there is a fall at 1 in 300 for ½-mile, followed by a rise steepening to no more than 1 in 200 for the next 1½ miles; after that the average grade is 1 in 100 up for 3¼ miles, and then between 1 in 100 and 142 for 3½ miles further, to post 62½, at Adavoyle station. A "breather" for ½-mile down at 1 in 142 is succeeded by the final stage of an arduous ascent—2½ miles at 1 in 135–120 to the summit point

G.N.R. (IRELAND). BELFAST—DUNDALK.

Distance.	Engine 4-4-0 No. / Load to— / Goraghwood E/F / Dundalk E/F	191		190		190		172		Distance.	113		190	
		*220/235 191/205		*233/250 166/180		*177/190 177/190		*236/250 187/200			§156/170 ¶170/185		§147/160 ¶147/160	
Miles.		m.	s.	m.	s.	m.	s.	m.	s.	Miles.	m.	s.	m	s.
0·0	Belfast	0	00	0	00	0	00	0	00	24·9	30	20	28	40
2·4	Balmoral	5	20	5	05	5	45	5	20	22·5	27	05	25	10
4·2	Dunmurry	7	55	7	45	8	35	8	10	20·7	25	25	23	40
7·6	Lisburn	11	55	12	00	12	35	12	35	17·3	22	05	20	25
10·2	Maze	14	25	14	50	15	10	15	30	14·7	19	30	18	00
14·5	Moira..	18	40	19	25	19	35	20	30	10·4	14	55	13	50
16·6	Mile-post 96	20	50	21	50	21	40	23	25	8·3	12	35	11	40
20·0	Lurgan	23	55	25	05	24	45	27	10	4·9	8	10	7	40
23·9	Seacoe Box	27	25	28	35	28	15	30	55	—	—		—	
24·9	Portadown	29	05	30	05	29	45	32	30	15·8	18	55	18	10
5·7	Tanderagee	8	50	8	15	8	30	8	05	10·1	12	25	11	30
8·0	Scarva	11	25	10	45	4	50	10	25	7·8	9	55	9	10
10·7	Poyntzpass	14	25	13	40	5	00	13	10	5·1	6	45	6	25
15·8	Goraghwood.. ..	†19	35	‡18	45	11	00	19	00	17·7	27	35	25	20
18·4	Bessbrook	22	50	21	50	5	50	5	40	15·1	24	40	22	20
22·2	Summit	28	30	27	30	12	50	13	20	11·3	20	55	18	20
25·2	Adavoyle	31	45	30	50	16	20	16	55	8·3	16	00	14	35
29·7	Mount Pleasant ..	35	25	—		20	30	—		3·8	7	20	6	45
33·5	Dundalk	39	10	40	30	24	30	24	50	0·0	0	00	0	00
24·9	Schedule	30		30		30		30		24·9	29		29	
15·8	Times	40		40		8+5+11		20		15·8	20		20	
17·7	(Minutes)					2		27		17·7	26		25	

E: Tons Empty. F: Tons Full. * From Belfast. † Slip one coach. ‡ Slip two coaches.
§ From Dundalk. ¶ From Goraghwood to Belfast.
NOTE.—Thick horizontal line indicates booked stop.

Digitized by Google

at mile-post 65½, reached after 11 miles of practically continuous climbing. On the easy first stage No. 113 attained 38 m.p.h., and then fall back to 30 m.p.h. on both sections of the climb proper, with a maximum of 36 after Adavoyle. Descending to Goraghwood the highest speed was 77 m.p.h. In the dip beyond Goraghwood No. 113 attained 57 m.p.h. from the fresh start, reduced to 35 through Poyntzpass, and reached 63 again at Tanderagee. From Portadown a speed of 50 m.p.h. was attained on the downhill mile before mile-post 65½ was 40 m.p.h. exactly. After that we did not exceed 71½ m.p.h. on the descent to Goraghwood, and completed this stretch in but 20 sec. over the 25 min. allowed—a harder booking even than that of the north-bound "Limited Mail." Between here and Portadown, however, nearly 2 min. were gained on schedule, and the final 29 min. booking into Belfast was also improved on slightly. The latter time—28 min. 40 sec. start-to-stop for 24·9 miles—entailed speeds of 66 m.p.h. past Maze and Lisburn, and a

G.N.R. (IRELAND). DUBLIN—DROGHEDA—DUNDALK.

Distance.	Engine, 4-4-0 No.	113	171	173	Distance.	114	190	174	172	170
	Load to— Drogheda E/F	214/230	226/240	213/230		220/235	210/225	248/265	250/265	250/265
	Dundalk E/F	181/195	194/205	180/195						
		m. s.	m. s.	m. s.	miles.	m. s.	m. s.	m. s.	m. s.	m. s.
0·0	Dublin	0 00	0 00	0 00	31·7	36 15	35 50	36 10	35 05	36 00
1·6	Clontarf	4 10	4 10	4 40	30·1	33 35	32 40	33 15	32 35	33 05
4·8	Howth Junction..	8 40	8 35	9 25	26·9	29 55	29 25	29 35	29 20	29 45
6·7	Portmarnock ..	10 40	10 35	11 35	25·0	27 45	27 35	27 30	27 30	27 45
9·0	Malahide ..	13 05	13 05	13 55	22·7	25 10	25 25	25 00	25 10	25 30
13·9	Rush & Lusk ..	18 00	18 20	19 05	17·7	20 20	21 10	20 15	20 50	21 05
16·0	Mile-post 16 ..	20 45	21 10	21 55	15·7	18 05	19 10	18 05	18 35	18 55
18·0	Skerries	22 50	23 20	24 10	13·7	15 45	17 00	15 55	16 15	16 35
21·7	Balbriggan ..	26 25	27 10	27 50	10·0	11 50	13 00	12 10	12 05	12 35
							p.w.s.			
27·2	Laytown	31 40	32 30	32 55	4·5	6 35	6 55	6 50	6 35	7 15
31·7	Drogheda ..	*36 55	*37 30	38 10	22·5	27 45	27 55	27 00	28 10	27 35
37·2	Mile-post 37¼ ..	45 10	45 10	9 40	17·0	21 55	22 00	21 00	22 20	21 30
43·6	Dromin Junction	51 30	51 15	15 45	10·6	14 00	14 25	13 40	14 30	14 35
47·2	Castlebellingham	54 40	54 20	19 10	7·0	10 10	10 05	9 40	10 35	10 40
							Sigs.			
52·0	Mile-post 52 ..	59 35	59 05	23 45	2·2	4 45	4 25	4 10	5 00	5 00
54·2	Dundalk	63 05	62 15	26 45	0·0	0 00	0 00	0 00	0 00	0 00
54·2	Schedule times (m.)	64	64	38 27	31·7 22·5	37 27	37 28	39 28	37 27	36 27

E : Tons empty. F : Tons full. *. Slip one coach.
NOTE.—Thick horizontal line indicates booked stop.

Lurgan, falling to 47 at mile-post 96; onwards the travelling was moderate, varying between 60 and 65 m.p.h. between Moira and Dunmurry, but finally increasing to 72 beyond Balmoral.

My own trip, on the 9.15 a.m. out of Dublin, was considerably superior to this. With only 10 tons less train-weight, we succeeded in maintaining 32½ m.p.h. steadily on the 1 in 100 past Mount Pleasant, increased this figure to 38½ by Adavoyle, and further to 48½ on the slight ensuing dip, while the final minimum at top speed of 72½ m.p.h. at Balmoral. Such smart running was most stimulating, and it is only just to add, by way of comment, that the travelling in the train was as smooth and as comfortable as that of the English Great Northern main line of the L.N.E.R. between King's Cross and Doncaster, which in my judgment is the highest tribute that it is possible to pay to the running over any route.

We now pass to the second table, detailing the performance over the easier section south of Dundalk. There are, first, a

Digitized by Google

couple of runs on the 3 p.m. north-bound express, which is timed to cover the 54·2 miles from Dublin to Dundalk in 64 min., inclusive of a severe slowing through Drogheda, where a coach is slipped, followed by the only severe bank on this section—4¼ miles up from mile-post 33, first at 1 in 167, but chiefly at 1 in 177. The other moderate ascents are 1¾ miles up at about 1 in 200 from the first mile-post out of Amiens Street, and 3½ miles up, 2¾ of them at an average of 1 in 170, to the 16th mile-post. After the first climb, speed varied between 63 and 55 m.p.h. on the first run, and 61 and 53 on the second, when on all the exposed stretches of line No. 171 felt the adverse effects of a gale of wind and rain from the west. Minima at mile-post 16 were 46 and 45 m.p.h., and maxima at Skerries 66 and 64 m.p.h., after which speeds were maintained at an average round about the mile-a-minute rate on to Drogheda.

After Drogheda slack, the honours rest with No. 171—ably handled by Driver O'Farrell—who, after getting into the shelter of the cutting from the high and exposed embankment beyond the Boyne Bridge, accelerated with 205 tons up the 1 in 177 to 50 m.p.h. before topping the summit at Kellystown. On the descent of Dunleer bank the maximum rate was 74 m.p.h., and despite the unhappy weather conditions, O'Farrell brought his train into Dundalk 1¾ min. ahead of time. No. 113 breasted Kellystown at 44 m.p.h., and touched 75 an hour at Dromin Junction, after which easy travelling brought the train into Dundalk a minute early.

On my run on the 9.15 a.m. down we made a leisurely start to Portmarnock, but after that we touched 61 m.p.h. at Malahide, fell to 42½ at mile-post 16, and reached 66 m.p.h. at Balbriggan. After re-starting from Drogheda we attained and maintained 41½ m.p.h. up to Kellystown Summit, afterwards touching 72½ m.p.h. down Dunleer bank. The sum of the two times of 38 min. 10 sec. and 27 min. 45 sec., on the Dublin-Drogheda and Drogheda-Dundalk stages respectively, showed exact time-keeping.

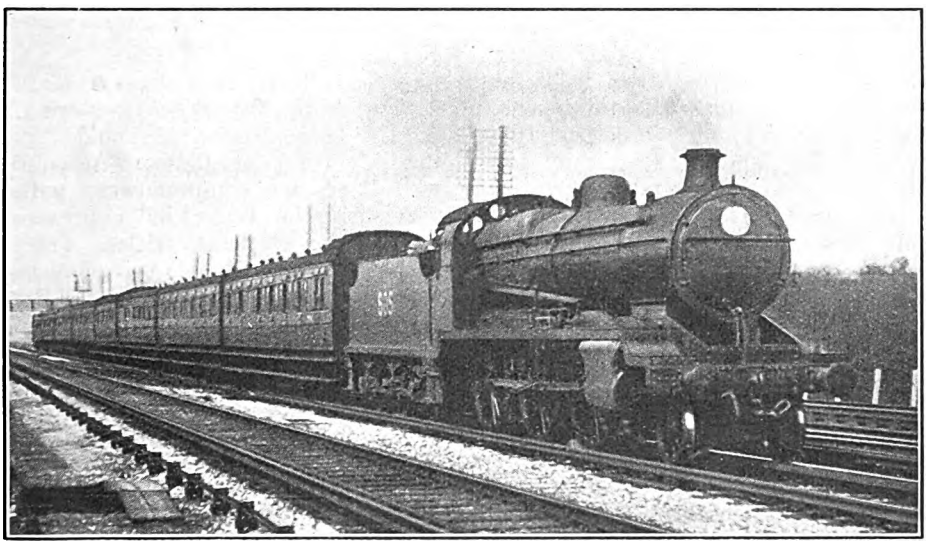


Photo.] [*D. L. Rumble.*

CHARING CROSS-ASHFORD TRAIN NEAR ORPINGTON.
Rebuilt 2-6-0 locomotive (formerly 2-6-4T) No. A 805.

Coming south, No. 114 had an easy task with 235 tons; losing ¾ min. on the first stage, the driver recouped it on the second. Speed reached 60 m.p.h. at Castlebellingham, fell to 45 up Dunleer bank (5 miles at 1 in 198), and touched 69 m.p.h. before Drogheda. On my run with No. 190, we were checked by signal at Castlebellingham, after attaining 64½ m.p.h., but breasted Kellystown at 48½, and touched

Digitized by Google

71½ before Drogheda, the net time from Dundalk being 27 min. The three corresponding speeds of No. 174 were 58, 48 and 68 m.p.h. respectively, while with No. 172 they were 57, 45 and 74 m.p.h. The last of the five up journeys was my footplate trip, when we touched 64 m.p.h. at Castlebellingham, topped Kellystown Summit at 45, but did not exceed 64 an hour in descending to Drogheda.

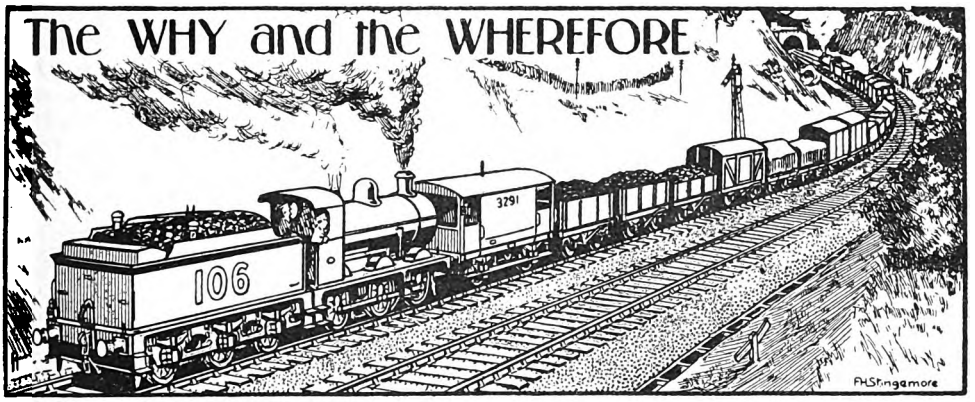
On the continuation journeys from Drogheda to Dublin No. 114 reached 60 m.p.h. at Balbriggan, fell to 45 up to mile-post 16 (1½ miles at 1 in 150), and showed a maximum of 66 m.p.h. on the subsequent descent. My run with No. 190 was the fastest of the series, as despite a permanent-way relaying check at Gormanstown, we made Amiens Street in 35 min. 50 sec. from Drogheda. Before the check we were doing 65 m.p.h.; mile-post 16 we breasted at 52½, and the maximum down Rush Bank was 71½ m.p.h.; net time from Drogheda to Dublin was just under 35 min. On the remaining runs, No. 174 is claimed to have reached 64 m.p.h. at Gormanstown, and 66 down Rush Bank, with an intervening minimum of 53 m.p.h., while No. 172 is credited with 61½ an hour at Laytown, 47½ at mile-post 16, and no less than 75 past Rush and Lusk, but I cannot help thinking that certain of these are rather higher speeds than warranted by the passing times. One final note in connection with the runs embodied in these tables is that on only one of all the journeys detailed were checks of any kind experienced, the permanent-way and signal checks in this case only entailing a loss of about 2 min. all told. I seldom remember publishing tabular matter of this character so entirely free from delays, and, with all allowance for the comparatively modest amount of traffic over the route concerned, this is greatly to the credit of those concerned in the operation of the trains over this system. At this stage I must bring these notes to an end, and I will endeavour in future to avoid my correspondent's reproach as to avoiding all reference to Ireland over a space of more than ninety issues!

My "conundrum" of last month appears to have caused but little concern to a number of readers, and the first solution, from Mr. N. D. Ellis, reached me the morning after publication. The trains concerned are the 8.55 a.m. from Manchester Central to St. Pancras, due at 1.30 p.m., and the 9.10 a.m. from Bradford to St. Pancras, due at 1.25 p.m., which pass through Trent Junction, in opposite directions, at 11.0 and 11.10 a.m. respectively. Up to the date of correcting the proofs of this article (May 7) I have received solutions also from W. T. Thornewell, G. L. W., G. H. and B. H. Cannon, J. W. Walker, E. V. Dolby, F. Brown, W. G. Massey, J. More, E. G. Twining, "Staffordshire Knot," A. C. B. Brown, R. A. H. Weight, G. M. Robertson, Stephen Robinson, Frank Grimoldby, R. E. G. Read, "Leeds," R. Angus-Lewis, H. T. L. Champness, "Midland," C. Hutchison, Rev. A. G. Brown, and C. E. Turner-Jones. I should like to thank several of these correspondents, who have not communicated with me previously, for their kind expressions of appreciation of these articles. Letters of interest have also been received during the month from R. J. Kemball, C. E. W. Neat, B. Worthington, John Currie, E. W. Maybank, F. J. Thomas, F. D. Barmby, H. J. J. Griffith, W. S. Johns, J. W. S. Soutter, Jas. Phillips, and G. C. R. Lamburn.

One of the conundrum solvers has been good enough to propound another problem, which, with slight amendments, is as follows. On what through service do a set of through coaches, provided over a portion of their journey with restaurant-car facilities, complete daily a journey of over 200 miles without calling at any town of 100,000 inhabitants or over, starting and stopping places included? This applies to two through daily workings in each direction over the same route.

And, last of all, congratulations to the London Midland & Scottish Company for their really sporting achievement of April 27 last, when their 400-mile non-stop runs from Euston to Glasgow and Edinburgh were made. As readers will know, the non-stop craze finds but little support in these articles, but to make non-stop journeys of this character with so little in the way of preparation was certainly a feat worthy of record.

Digitized by Google



RAILWAY MAGAZINE *readers desiring information should mark envelopes "Query" in the upper left-hand corner, and address them to the Editor. Questions relating to the dimensions and weights of railway rolling-stock and to names, numbers, dates, &c., of locomotives should not be forwarded. No reader should send more than two questions in one month. Correspondents are requested to write on one side of the paper only, and although they must give their names and addresses, pen-names or initials may be inserted for Editorial use. Before asking for information concerning railway history or "grouping," the pages of the "Railway Year Book" (5s. net) should be consulted. The thirty-first Annual Edition* (1928) *of this standard railway reference work is now published. All previous Editions are out of print.*

Metropolitan District Cars.

In view of services performed on behalf of the L.M.S.R. between Campbell Road Junction and Barking, a number of vehicles in use on Metropolitan District Railway services are actually the property of the L.M.S.R. As, however, it is impossible to keep the services distinct, they are worked more or less in common with those which actually belong to the Metropolitan District Railway, and although at one time the L.M.S.R. cars could be individually identified, as you point out, this is not now the case. The Whitechapel and Bow Railway is still joint L.M.S. and Metropolitan District property. Your comments as to painting of Tilbury section and North London locomotives and rolling-stock are noted. We cannot explain variations in painting practice.

[Reply to "TILBURY SECTION, L.M.S."]

L.M.S. Sleeping Car Services.

The time-table announcement to which you refer as to the provision of a sleeping car from "Aberdeen to Bletchley" is doubtless simply to indicate that through sleeping car facilities are provided from Scottish stations to Nuneaton, Rugby and Bletchley, for which purpose one of the sleeping cars on the up "Royal Highlander" is transferred at Crewe to the 5 a.m. train, which makes these stops. The car does not, of course, terminate at Bletchley, but runs through to Euston on the train to which it is attached, and in the event of the sleepers on the express portion being fully occupied, is doubtless used to some extent by London passengers who are not in a hurry to reach town at the earlier hour.

[Reply to E. M. SANDERS.]

Fastest Continental Runs.

We are not aware of the reason why the Midi Company of France runs the south-bound Sud Express between Bordeaux, Dax and Bayonne at a speed so much higher than that of the north-bound train, or than that of the Pyrenees-Côte d'Argent express in both directions; it is probably in order to maintain a reasonably early arrival in the evening at Biarritz and at the Spanish frontier. The haulage is exclusively electric over the Midi main line from Bordeaux southwards. It was obviously a printer's error in Mr. Allen's April article, in the speed tables of British and French runs, that attributed the Paddington-Westbury runs of the G.W.R. to the L.N.E. Company.

[Reply to R. NEWMAN, C. G. WOODNUT and "QUESTIONER."]

Digitized by Google

Ludlow-Clee Hill Branch, L.M.S.R.

You are mistaken in suggesting that this branch has been closed, as it serves an important roadstone quarry at the summit of the Titterstone Clee. This quarry has, it is understood, its own railway system connecting with the L.M.S. and G.W. branch line. In response to an inquiry, Mr. T. R. Perkins explains that the branch leaves the Shrewsbury and Hereford Joint line 24 chains north of Ludlow station and runs for six miles in an easterly direction, with sidings at Middleton and Bitterley. It was opened in 1859 and has always been used for goods traffic only.

[Reply to "ROWINGTON JUNCTION."]

Right- and Left-Hand Drive.

The advantage of the old-established driving position on the right-hand of the footplate is that the fireman can work his shovel right-handedly without the driver being in his way; when the engine is driven on the left-hand this is not so easy. On the other hand, from the left-hand position the driver gets a considerably better view of the signals applying to his road, and in these days of very high-pitched boilers and Belpaire fire-boxes with vertical sides, the look-out from the right side of the footplate to the signals at the left of the track is becoming so restricted as to make left-hand driver almost essential.

[Reply to W. S. W.]

Steam Brakes for Locomotives.

Although, as you point out, steam brakes were introduced to a limited extent at a quite early date, they did not become general for a considerable period, largely due to the fact that hand brakes could generally meet requirements under the conditions which then obtained. It should be remembered that the main problem was the production of a continuous brake, and it was only as the need arose for utilising the engine as well as the tender wheels for braking purposes and for providing for the associated application of engine and train brakes that the steam brake for the engine became so important.

[Reply to J. G. STURT.]

Station Platforms.

In early days many country stations were laid out with the platforms so placed with regard to a level crossing that trains in each direction reached the platform after passing over the crossing, thus enabling the road gates to be opened behind them, whereas, if positioned otherwise, the gates would have to be kept closed all the time a train was standing at the station. Presumably, the stations mentioned by you are of this class.

[Reply to J. M. POTTER.]

Dover Pullman Boat Express, S.R.

In the down direction this express usually passes Sydenham Hill and enters Penge Tunnel at about 30 m.p.h., or slightly less, and in our experience the speed on emerging from the tunnel, through Penge, is seldom in excess of 50 m.p.h., at most. On passing Kent House the speed may occasionally reach 55 m.p.h., but is generally maintained at a strictly moderate figure, on account of curves and train service congestion.

[Reply to "BM/XFMA."]

"The Royal Scot."

For winter working the formation of this train was reduced in October last to 8 eight-wheelers for Glasgow, and 3 eight-wheelers and a 12-wheeled dining car for Edinburgh, a total of 12 vehicles, or 50 axles. The tare weight of this set is just under 350 tons. "Royal Scot" locomotives are allowed into London Road, Manchester, but we have no information as to whether or not they are permitted over both the Styal and Stockport routes.

[Reply to G. C. WILSON.]

Rail Bonds.

The wires which you have noticed connecting the running rails across the rail joints on sections of the L.N.E.R., are rail bonds employed to complete electrical connection from one rail to another for track circuit or other purposes. We have no information as to when the old passenger station at Chingford ceased to be used for passenger traffic and became a goods depot. It is, however, a good many years ago.

[Reply to "BUCKTANK."]

Colours of Foreign Locomotives and Passenger Rolling Stock.

We are unable to reply authoritatively in regard to most of the railways as to which you ask, and suggest that it would be a matter of general interest if readers

Digitized by Google

who have seen a good deal of locomotives and trains of countries in various parts of the world would supply information on this point, which could be correlated and published as a definite contribution on the subject.

[Reply to H. J. SOUTHWORTH.]

French Railway Track.

A chaired road was at one time standard on the Paris–Orleans main lines, but is now being replaced by flat-bottomed rails carried on sole-plates, in accordance with the usual French practice. The high super-elevation of the outer rail on sharp curves in France is due to the fact that considerably higher speeds are permitted round such curves than over curves of the same radius in this country.

[Reply to "ACTON."]

Train-timing.

It is impossible to obtain accurate railway speeds by reference to telegraph posts, as these are not set out with any minute accuracy, and their location is often subject to variation in order to miss lineside objects. Apart from the estimation of speeds from the mile-posts, the only other reliable method is estimation off the rail-joints, but this needs close acquaintance with the rails in use, and an acute ear.

[Reply to C. H. MOUNT.]

L.M.S. Locomotive Painting.

The large letters "L.M.S.," replacing the numerals on the tender sides, and the large numerals on the cab sides, are the new standard painting for L.M.S. locomotives. As we explain fully elsewhere, all L.M.S. engines except those of specified classes are being painted black. In the case of passenger engines, this is relieved by thin red lines, similar to freight and tank engines on the L.N.E.R.

[Reply to ALEC LOW.]

Express Train Speeds.

The timings to which you call attention are pass to pass times, and not start-to-stop times, as in the case of the slip at Chippenham off the 4.30 p.m. from Paddington. Obviously, the start-to-stop time calls for considerably the faster running, on account of the time lost in getting into speed and slowing down for the stop, so that the runs you quote do not affect the question.

[Reply to C. J. ROBERTS.]

Electric Lines, Southern Railway.

Presumably, the section of line mentioned by you is one on which a length of rail is laid between the running rails to amplify the current-carrying capacity of the running rails for the circuit return. There are a number of places where this is done to ensure sufficient current-carrying capacity. These rails do not, however, have any contact with the train, but are merely bonded with the running rails.

[Reply to MENDIP.]

Irish Railway Matters.

We cannot say as to the suggested intention to run through coaches between Belfast and Cork. It is by no means improbable. Obviously, it cannot be intended to close Kingsbridge and Broadstone stations in Dublin and concentrate on Amiens Street, as the two former are Great Southern stations, and the latter the Great Northern terminus. Your request for more Irish articles is noted.

[Reply to "HOPEFUL."]

Some Glasgow Railway Distances.

From Queen Street (Low Level) to Dumbarton *via* Scotstounhill is 14 miles 37 chains; from Central to Wemyss Bay is 30 miles 70 chains; and from St. Enoch to Troon, *via* Paisley (Gilmour Street) and Beith, is 34 miles 71 chains. We fear that it is difficult to get hold of working time-tables, either current or out of date, unless you are in the railway service.

[Reply to F. A. PLANT.]

Smallest Railway Terminus in London.

You are correct in pointing out that the reply given in the October, 1926, number should have considered also Marylebone station, L.N.E.R., which has four platforms, whereas Fenchurch Street and Holborn Viaduct have five each. Manchester (London Road) was described in the October, 1901, issue, now out of print.

[Reply to A. GRUBER.]

Shuttle Service.

This term is generally used where a train runs to and fro over a branch line or between two places not very far distant so as to maintain a more or less frequent service independent of others. Sekon's "Dictionary of Railway Words and

Digitized by Google

Phrases" is long since out of print. You might possibly be able to obtain a second-hand copy.

[Reply to H. NORMAN WOOLHOUSE.]

Engine Stocks at Locomotive Depots.

We cannot make comparisons between various locomotive depots on the lines you suggest, partly because to do so would open the way for a large number of other queries and partly because, unless special enquiries are instituted, our information does not include details of the numbers and classes of engines attached to each depot.

[Reply to R. H.]

Tank Locomotives.

"Biggest" is a vague expression in regard to the locomotive, as we have had occasion to remark previously in these columns. In regard to both tractive effort and total weight, the 4-6-4 Glasgow and South Western tanks of the L.M.S. are beaten by the Horwich-built 4-6-4 4-cylinder tank engines of the same company.

[Reply to J. H. BILES.]

Locomotive Programmes.

So far as particulars of new construction are available, information as to programmes of new locomotive construction in hand at the works of the various railway companies is given either in "Locomotive Matters" or elsewhere, as convenient. We cannot undertake to supply information beyond that which comes to hand from authoritative quarters.

[Reply to F. V. W.]

Locomotive Restrictions on Suburban Lines.

It may be that certain locomotive classes are not allowed on specified suburban lines, even although the use of engines of older classes may necessitate banking or double heading. We cannot, however, deal with such individual cases, as there are so many instances where such restrictions may or may not apply.

[Reply to "4566 GLENDOWER."]

Loads of "Class 1" Engines, L.M.S.

Maximum standard loads are laid down only for the express trains over the Midland Division. A load of ten bogies is certainly exceptional for a Midland 2-4-0 engine, but the Derby and Birmingham road is the easiest on the Division, and the football special train concerned would only be timed at a very moderate speed.

[Reply to "MIDLAND."]

N.B.R. Locomotive No. 224.

This engine, which went down in the tragic Tay Bridge accident of 1879, was at work until recent years, and has several times been illustrated in these pages. It was, however, withdrawn from service a few years ago. We have no knowledge as to the S.R. locomotives used for the making of "The Ghost Train" film.

[Reply to S. J. CORNISH.]

Feed-Water Heating.

Apparatus that you have noticed on the L.M.S. (L.N.W.) "George the Fifth" class engine *Moorhen* is for feed-water heating, with a pump to deliver the hot feed to the boiler. We have no information on your second query. No. 6126 of the "Royal Scot" class is named *Lancashire Witch*.

[Reply to E. B.]

Birkenhead Services, G.W.R.

We have not space in which to detail the train services between Birmingham and Birkenhead. It is surely a simple matter for you to secure a Great Western time-table, which will give all the information you require. If you desire to work out the average speeds, Bradshaw's Guide will give you all the station distances.

[Reply to D. C. BALDWIN.]

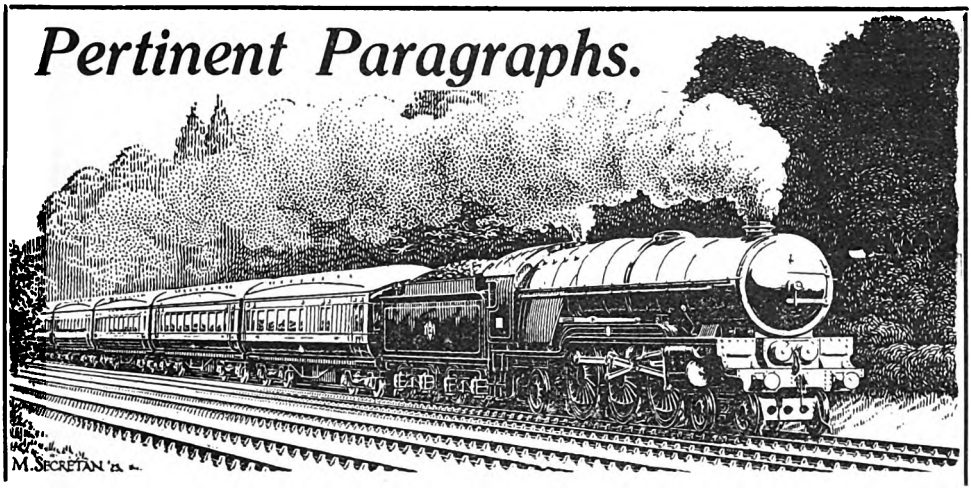
Destination Boards, S.R.

Reference was made last month to the new type of destination board adopted for the recently electrified routes of the Southern Railway. Presumably, this type will be applied elsewhere in due course. The improvements noted by you will probably be incorporated in the electric stock generally.

[Reply to D. CAMPBELL.]

Digitized by Google

Pertinent Paragraphs.



L.N.E.R. Exhibition at Leeds.

THE fifth of the series of exhibitions of the latest types of locomotives and passenger rolling-stock in use on the L.N.E.R., held in the North Eastern Area, was held recently at Leeds, and proved a great success. The series began in a very small way by some friends of the hospital asking for the help of the railway company at Blyth. They have since developed, and with progressive popularity have been held at Redcar, Newcastle and Hull. It is intended to repeat the exhibition at West Hartlepool and at York in June, when it will form one of the chief items of the opening day of York civic week.

The exhibition was effectively staged at New station, Leeds, where platforms 10, 9 and 8, at the north-eastern end of the joint station, were devoted to the purpose. Beginning with the new container, type B, the visitor passed to a York-built mail van, fitted with the usual sorting equipment. Through the vestibule one passed to the Pullman coach *Iolanthe*, used on the West Riding service. A third-class corridor coach, No. 1048, and a ten single-berth sleeping car, as now in service, led on to a first-class restaurant car. A modern three-stall horse-box completed the rolling-stock. There was, in addition, a 50-ton travelling breakdown crane loaned by the L.M.S.R. Company. Platform 9 contained the locomotives, where the principal popular interest was centred in the Glasgow-built Pacific *Gladiateur*. Technical visitors were greatly interested in the Kitson-Still engine, built last year by Kitson's, of Leeds. Other locomotives were the *Lincolnshire*, one of the Darlington-built "Shire" class 3-cylinder 4-4-0, and a "Tennant" express engine, built in 1885 at Darlington. There were also a passenger tank engine (built at Darlington, 1913) a freight-tender engine (Darlington, 1920), a small shunting tank engine, with 50-cwt crane (Gateshead, 1888); and one of the latest Sentinel-Cammell cars—the *Perseverance*, just delivered at York. On No. 8 platform was a small collection of models illustrating brake valves, link gear and other equipment.

The New L.M.S.R. Locomotive Livery.

FOR some time past many L.M.S.R. locomotives have been in service painted, lined, lettered and numbered on what appeared to be a temporary style, instead of being finished in accordance with the practice introduced after grouping, and we are now advised that a new practice in this connection has been definitely adopted. First-class passenger express tender locomotives will continue to be painted red, but will carry the engine numbers on the cab panels of tender engines, while the letters L.M.S. are to be prominently displayed on the sides of tenders in place of the large engine numbers hitherto shown there. The engine classes thus concerned are the "Royal Scot" 4-6-0's, the Standard Compound 4-4-0's, and the "Claughton," "Prince of Wales" and "Hughes" four-cylinder 4-6-0's. The same method of displaying lettering and numbering will also apply to all other engines, passenger and goods, but passenger locomotives, other than the classes mentioned above, are to be painted black and relieved with red lining, while the goods engines will be plain black as heretofore. In practice, this means that prinicipal express trains will retain the harmony of locomotive and carriage colours, but for ordinary and local engines which do more miscellaneous work, black, with red lining, will be the rule. It is interesting to recall, too, that a lined black livery constituted an effective standard on both the old L.N.W. and L. & Y. Railways.

Digitized by Google

Motor Lorries in Goods Service on the Southern Railway.

THE Southern Railway announces that it has been decided to employ motor transport to a much greater extent for collection and delivery services to and from certain London depots and provincial stations. At the present time a large number of horse teams are employed in London on what is known as the Outer Circle, involving long journeys and a high percentage of relief horses, &c., and it is for this reason that the extended use of motor vehicles has been decided on. It will also be possible in the provincial districts to provide an extension of the existing cartage boundaries, which are usually limited to a distance of one mile from the company's stations. It is anticipated that about 100 horses will be displaced. For the present, orders for 52 motor lorries are being placed, consisting of 38 for 2-ton loads and 14 for 4½-ton loads. Twenty of the new vehicles will be stationed at Nine Elms goods depot, while the remainder will be attached to some of the larger provincial stations throughout the system. Brighton will have six of them. The new lorries will give a greatly improved cartage service, especially in the country districts where they are to be used.

Investigating Engine Failures.

IN order to maintain railway rolling-stock in the maximum state of efficiency, it is essential that all cases of failure should be carefully noted with a view to ascertaining their probable cause and preventing their recurrence. The methods used in the locomotive departments of our railways with regard to collecting, classifying and analysing locomotive failures vary considerably in detail, but Mr. J. Clayton, in the course of a paper read before a meeting of members of the Institution of Locomotive Engineers in London, on March 29, gave some typical examples of the methods employed. The failures are recorded by the enginemen on a special form, and the evidence obtained therefrom is collected and analysed in order to arrive at the probable cause. In some cases, as is well known, a number of failures of one particular part will occur in a certain district, but in no other district with the same type of engine, and the analyses are particularly useful in arriving at a reason for this trouble, which, incidentally, is often found to be of a trivial nature and one which can easily be remedied. In the absence of any proper system of locating and analysing engine failures, this work of investigation is impossible, and a considerable saving in maintenance costs which might otherwise be effected is lost thereby.

As Others See Us.

WE have, on many occasions, quoted comments by foreign visitors to this country on our railways, and although their general trend is favourable, so that all such descriptions have much in common, remarks are often included which seem to be worth passing on. In the *New York Central Lines Magazine*, a Chicago business man "writes of railways in Great Britain." He is not, apparently, a railway officer, as some of his explanations of British railway terms are not quite right. Thus, he uses the word "shifting" instead of "shunting" as our term for "switching," anglicises "switch points" as "catch points," and speaks of rails as being double-headed to permit of reversal, a practice not now general. In other respects, however, his comments can be accepted as they stand. He remarks, for instance, on the fact that "their steel ties and stone ballast do not ride with the quiet resilience of ours," but later refers to our "wonderfully comfortable trains." "There's no jerking or jolt to the head when starting or stopping—not even on the 'stopping trains' as they call the local trains—and one does not realise the train has started until he sees the buildings, &c., seeming to move. There is less 'feeling' of the movement of a train over there than here." The writer also speaks favourably of our restaurant-car services, of the fenced-off right of way, and the absence of trespassers, and other features. He seems to think it strange that time-tables should have to be purchased, though he does not appear to have given any thought to their tremendous size, and the fact that free leaflets and folders for particular use are also available.

Proposed Preservation of a "Terrier" Locomotive.

FOLLOWING up previous correspondence, Mr. Malcolm M. Niven reminds us that the *Brighton* was a gold medal engine at Paris in 1878, and was the first engine to demonstrate the Westinghouse brake in France. In the course of his work as a marine engineer, he was at Littlehampton last year, and a "Terrier," in its original form, was shunting there. He also calls to mind the Stroudley engine, *Lochgorm*, at Inverness, the precursor of the "Terriers," and the very similar engines on the N.B.R. built by Mr. Drummond, who worked at Brighton at one time under Mr. Stroudley.

Old Cambrian Railway Locomotives.

SENDING photographs of two of the oldest engines now working on the Cambrian section of the G.W.R., Mr. I. A. Higgon writes: "These are two of the Sharp Stewart's well-

Digitized by Google

nown standard 0-6-0 type goods engines f the 1860-80 period, of which the Cambrian nce possessed the large number of 23. hese two engines Nos. 45 and 51, renumber- d G.W.R. 900 and 910, were built in 1864 nd 1865 respectively (works Nos. 1530 and 590), and bore the names 'Rhiewport' and Snowdon.' As originally constructed they ere minus cabs and had low weather oards only, but this deficiency was made ood when Mr. Aston rebuilt them at swestry in 1896 and 1894 respectively. They ere then fitted with new boilers of slightly ncreased heating surface, but with a ressure of 150 lb. as against the previous gure of 120 lb. Up to 1923 they remained nchanged, but in that year they were over-

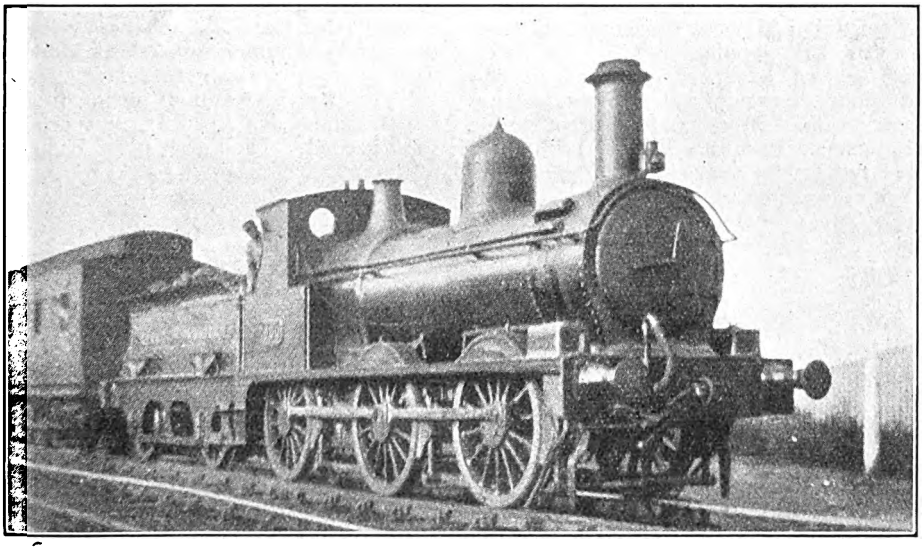


Photo.] [*I. A. Higgon.*

AN INTERESTING CAMBRIAN RAILWAYS LOCOMOTIVE REBUILT.

Cambrian 0-6-0 No. 45 as G.W.R. No. 900.

auled by the G.W.R. Company, and their ase of life renewed for a further number of ears. The main alterations received were ew smoke-boxes and chimneys of Great Vestern Railway pattern. No. 45 is shown hen running with the smallest tender on he line, the water capacity being only 439 gallons, while No. 51 has the tender of ld No. 4 of the same class.

"They are reserved exclusively now for hunting and pilot duties on the Coast ection at Portmadoc, their light weight, 6 tons 16 cwts., making them particularly uitable for working over Minffordd Yard nd other light sidings in the neighbourhood. Two are stationed at Portmadoc, the emaining two engines out of a total of four still running, being employed on the Oswestry branch lines. These two others are old Nos. 14 and 48, renumbered G.W.R. 898 and 908, and were built in 1875 and 1873 respectively the latter being old Mid Wales Railway, No. 9. At present Nos. 48 and 51 are working at Portmadoc, No. 45 having returned recently to Oswestry for overhaul. The passing of these once familiar little engines will be noted with regret by followers of the old Cambrian."

Lord Dalziel of Wooler.

THE death of Lord Dalziel of Wooler, on April 18, after only a few days' illness, came as a great shock to his many colleagues and friends on both sides of the Channel. He was perhaps best known as one of the leading personalities in the development of international travel facilities, particularly in regard to the provision of luxurious and exceptionally comfortable passenger accommodation. As Chairman of the Pullman Car Company, Mr. Davison Dalziel (as he then was) was responsible for the buying out of American interests more than 20 years ago, and he inaugurated a new era in luxury travel on British railways when the "Southern Belle" commenced running between London and Brighton in 1908. Complete Pullman trains and other Pullman services of the latest type are now standard and popular features on many main lines in Great Britain, but what may be called Lord Dalziel's latest victories

Digitized by Google

in this respect have been won on the European Continent. He joined the Board of the International Sleeping Car Company some 25 years ago, being at that time the only British representative on that body. Since his very active participation in the control of that company within the past few years its expansion has been marvellously successful. While fully preserving the international character of the Sleeping Car Company, Lord Dalziel was at the same time responsible for the placing of orders of considerable magnitude for vehicles intended for various Continental services with British firms of repute. It was on his initiative that the famous "Blue Trains" between Calais and the Riviera were inaugurated in 1922, and more recently the "Golden Arrow" services between Paris and Calais and the Paris-Amsterdam "North Star" service. All these developments have been extremely popular, and Lord Dalziel, in his position as executive head of the International Sleeping Car Company, became an international railwayman of great power and influence. Speaking French as fluently as English, and being well acquainted with leading railwaymen on both sides of the Channel, he was a valuable link between the railways of this country and the Continent. A permanent British interest in the affairs of the Sleeping Car Company was secured last year largely through his instrumentality by the formation of the International Sleeping Car Trust.

Some L.N.E.R. Comments and Observations.

MR. R. A. H. WEIGHT sends the following notes and comments :—

"From May 1, when alterations already announced took place in the running of the L.N.E.R. Pullman expresses, the timing of the up "West Riding" was accelerated to give a four-hour booking from Harrogate to London, with stops at Leeds and Wakefield. The 175·7 miles non-stop from Westgate (Wakefield) to King's Cross are now allowed only 183 min., which gives a throughout average of 57·6 m.p.h. This incidentally provides the fastest schedule ever given for such a long regular run on the L. and N.E. or its constituent original lines, and, furthermore, it is probably the speediest express over a comparable distance to or from the north and London.

"The Easter traffic to and from King's Cross was very heavy, and was handled with remarkable punctuality and success. I recorded 50 additional up and down express and main-line trains on Thursday, April 5, nine on Saturday 7th, 12 on Sunday 8th, 36 on Monday 9th, and 19 on Tuesday 10th, or 126 in all. Of many heavy loads, the greatest, on Thursday, 5th, was probably the main portion of the 1.30 p.m. Yorkshire express, which totalled 530 tons behind the tender of rebuilt 4-6-2 2544 *Lemberg*, which engine made a capital start, passing Wood Green, 5 m.p., in 10 min.

On Monday, 9th, the up morning Hull and West Riding expresses were combined and run to the fast schedule from Doncaster to London of the 11.4 a.m., due King's Cross 1.55 p.m. Loaded to 16 cars, or about 530 tons in all, and hauled by Pacific 2562 *Isinglass*, the 82-min. timing from Peterborough to London was exactly kept. On the return journey with the same stock, combining the 5.37 and 5.45 p.m. departures, a much heavier complement of passengers was carried and the gross load may be computed at 540 tons. No. 4478 *Hermit* proved quite equal to the task and adhered closely to scheduled times. Such heavy loads and fine express running on a Bank Holiday are worthy of particular note.

"For the great annual outing to London and Wembley, on April 21, 25 special trains were needed. They arrived at King's Cross at intervals from 4.0 to 11.20 a.m., and departed with clock-like precision in close succession, from 11 p.m. to 2.30 a.m. Owing to the intervention of "summer time" at 2 a.m., the official hour of departure of the last special was 3.30 a.m. Engines employed included 6 N.E. Atlantics (5 three-cylinder, 1 two-cylinder), and 2 N.E. "R1" 4-4-0. For the return journey from King's Cross, two of the N.E. Atlantics were assisted, respectively, by a G.N. 4-4-0, and a G.N. small Atlantic. There were two G.C. Director 4-4-0 type from Leeds, and three 4-6-0 mixed traffic locomotives from Immingham. G.N. engines included unusual visitors in the shape of 2-6-0 engines of the "K2" and "K3" classes from Doncaster and Colwick."

New Irish Suburban Train Services.

MR. J. MACARTNEY ROBBINS writes :—A much improved local service of trains has been brought into vogue between Dublin (Westland Row) and Bray. The trains for Dalkey and Bray have had a number of stops removed thereby reducing the time to and from Dublin. The Dalkey and Bray trains now cease calling at stations between Westland Row and Blackrock, and in many instances non-stops are run to Dun Laoghaire (Kingstown) though during the less busy periods of the day, stops are made at Blackrock and Seapoint or Salthill. The non-stop trains take only 10 min. to run from Westland Row to Dun Laoghaire and *vice versa*, as against 15 min. for the majority of trains, which used to call at Lansdowne Road and Blackrock. The service is just as frequent, but the G.S.R. company has

Digitized by Google

added a number of local trains calling at all stations between Westland Row and Dun Laoghaire. These locals also call at two halts which have recently been opened at Sandymount between Lansdowne Road and Sidney Parade, and Merrion between Sidney Parade and Booterstown. This latter halt should be most beneficial to the Dublin children who paddle about on the shore close to the station. The local trains run every half an hour, leaving Westland Row at 3 and 33 min. past the hour. In the up direction, the majority of locals leave Dun Laoghaire at the hour and half hour. The G.S. Railways have a pleasant refreshment room at Dun Laoghaire station where meals and light refreshments can be served, a most useful adjunct to the town and is close to the promenade. A number of new bogie coaches have been placed on the Eastern section of the G.S.R., and numerals denoting class are giving place to the former lettering employed heretofore.

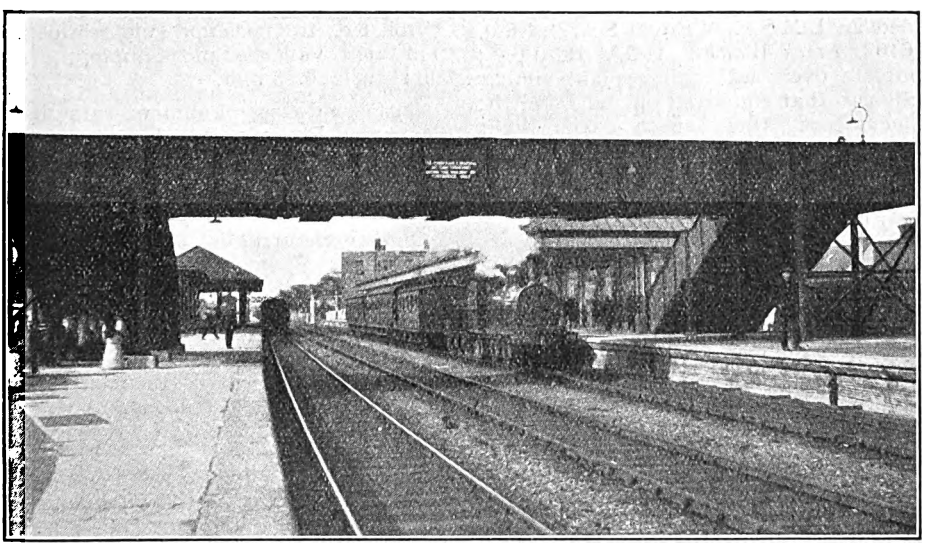


Photo.] [*J. Macartney Robbins.*

BRAY STATION (AS REBUILT), GREAT SOUTHERN RAILWAYS, IRELAND.

The Notice Board on the Bridge is in Irish and English.

A Railway Holiday Paper.

A RAILWAY advertisement on the lines of an eight-page illustrated journal is something of a novelty, and the promoters of the *North Eastern Rail Express* are to be congratulated on the skill and enterprise shown in the production of the first issue, a copy of which is now before us. The publication, it is expressly stated, is concerned with the "Season 1928," and covers a wide range—from the Thames to Moray Firth, to be exact. It is well written and equally well illustrated and printed. Circulation is being made from door to door in suitable districts.

Under the heading of "A Fascinating Problem," special attention is given to that hardy annual, the summer holiday question, and many valuable suggestions are offered as to the manifold attractions of the East Coast, with its dry, bracing air and its exceptional facilities in the matter of bathing, boating and fishing. Mountain, moor, dale and loch are dealt with in turn; whilst the Norfolk Broads and the various inland spas are briefly glanced at. A popular feature is that headed "Our System," which gives some interesting facts and figures respecting the L.N.E.R., and which will probably be a revelation to many.

That popular writer, Mr. Dell Leigh, contributes a couple of fascinating articles under the general heading of "Some Famous Cities"; there is a readable article on "Golf at Cruden Bay," by Bernard Darwin, and another on "Angling," by Corrigeen.

Interspersed here and there are tabloids of information respecting particulars of fares, train services, tourist tickets, period excursions, hotels, books to read when travelling, reserved seats, &c., together with a map of the L.N.E.R. system. Easy to read and easy to carry—just the sort of thing, in short, to appeal to the holiday maker, actual and prospective.

Digitized by Google

The Model Railway Club Annual Exhibition.

An exhibition of model locomotives, rolling-stock and other railway equipment, the work of members of the Model Railway Club, was held from Wednesday, April 18, to Saturday, April 21, at the Kingsway Hall, London. As usual, the attendance was excellent throughout, testifying to the popular interest shown by the public in everything connected with railways. This year, models constructed to the "O" gauge appeared to be most favoured and included a 2-8-0 + 0-8-2 model L.N.E.R. "Garratt," electrically driven, which, on the passenger-carrying track succeeded in hauling a total load of 39 stone. A 0-4-0 tank engine of "O" gauge also demonstrated its capabilities by hauling its owner seated on a trolley along the track. Other "O" gauge models included an L.M.S.R. "Royal Scot" 4-6-0, No. 6102, *Black Watch*; a G.W.R. 0-6-0; a complete overhead coaling plant similar in design to that employed on the L.N.E.R. at Doncaster; three-aspect colour light signals; a train ferry wagon of the Belgian State Railways for the Harwich Zeebrugge service; and some G.W.R. passenger and goods rolling-stock in which the details, lettering and paint work were faithfully represented.

No prizes are awarded at this Exhibition, but a number of certificates are given for models of particular merit. This year the awards were presented for an "O" gauge 4-6-2 tender locomotive built for coal-firing and based upon the well-known design by "L.B.S.C." and specially noteworthy for excellence of workmanship and wealth of detail; a series of exhibits which included a mechanical coaling and sanding plant constructed to the "O" gauge, and an older type coaling stage, built to the "OO" gauge; and an "O" gauge branch-line train realistically made up of coaches having slightly varying overall dimensions. The passenger-carrying model track kindly loaned by the Society of Model and Experimental Engineers, over which a model "Tilbury" 4-4-2 tank locomotive and a model L.S.W.R. Adams' outside-cylinder 4-4-0 hauled loads of enthusiastic youngsters, was again a popular feature. Films on model-railway building were exhibited at intervals during each day in the kinema, which was also much appreciated by many of the visitors as a rest room.

Trade exhibits were provided by Bassett-Lowke Limited, Buck & Ryan, Percival Marshall & Co., Bonds, Windsor Model Company, and the Leeds Model Company, and a stand representing the work of members of the Devon and Cornwall Model Railway Club.

Particulars regarding the Club's activities may be obtained from the Secretary, Col. R. Henvey, White Cottage, Shirley, nr. Croydon.

Improved Continental Services, via The Southern Railway.

To meet the demands of 1928, the Southern Railway and the Continental railway companies have arranged for this summer a number of new and accelerated services, as follows:—

1. *On and from May* 15:—

(*a*) New service to South Germany (for spas, &c.). Off 4 p.m. from Victoria *via* Dover-Calais-Hirson. Arrive Frankfort 11.14 a.m. Sleeping and restaurant cars.

(*b*) New through carriage to the Austrian Tyrol, &c., from Dieppe (Victoria dep. 8.20 p.m.) *via* Vallorbe and Simplon. Arrive Innsbruck 10.15 p.m.

(*c*) Second-class Pullman cars between Calais and Brussels to be introduced as well as first class.

(*d*) 2 p.m. service from Victoria to Belgium, &c., *via* Ostend, will leave later (at 2.45 p.m.) and be accelerated.

2. *June* 15 *to September* 15, *daily*:—

New express service to Cologne in 12 hours, *via* Dover-Ostend, Victoria dep. 10 a.m. Cologne arr. 9.56 p.m. same day. Berlin arr. 7.12 a.m. This will be the fastest service between London and Cologne.

3. *June* 30 *to September* 8, *Mondays, Wednesdays and Saturdays*:—

Fast daylight service to Switzerland by the short sea route, Folkestone-Boulogne. Victoria dep. 9 a.m. Bale arr. 14.45 p.m. same day. No night travelling.

4. *July* 1 *to September* 15:—

The fast night service *via* Dover-Ostend, which was so popular when introduced last year, will again be run, leaving Victoria every night at 10 p.m., arriving Ostend at 4 a.m., Brussels 6.22 a.m., and Berlin 9.58 p.m.

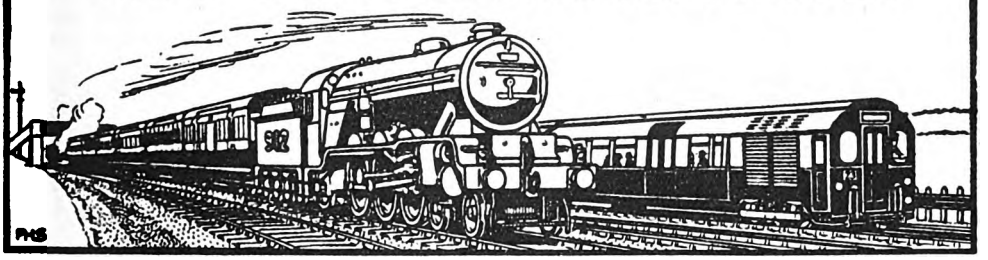
5. *July* 8 *to September* 16:—

The accelerated night service to Paris *via* Southampton-Havre will run every Sunday night in both directions, as well as week-days. This will be of great benefit to business men, as it will bring them to Paris at 10.30 a.m. on Monday mornings, in time for a day's business.

Full details, reservations, &c., may be obtained from the Southern Railway's Continental Inquiry Office, Victoria Station, London, S.W.1, or principal stations and tourist agencies.

Digitized by Google

WHAT THE RAILWAYS ARE DOING.



RECENT APPOINTMENTS, L.M.S.R.

The following appointments have been authorised by the directors :—

Engineer's Department.

Mr. F. J. Paice to be Dock and Harbour Assistant, Chief Civil Engineer's Office, Euston.

Mr. W. P. Whitehead to be Staff Assistant, Chief Civil Engineer's Office, Euston.

Mr. J. Briggs to be District Engineer, North Wales District, Bangor.

Mr. A. Oldham to be Signals Assistant to Divisional Engineer, Derby.

Mr. H. E. Morgan to be Signals Assistant to Divisional Engineer, Crewe.

Marine Department.

Mr. D. Gibson to be Superintendent Engineer to Chief Marine Superintendent, Euston.

Capt. Wm. Hill to be Marine Superintendent, Heysham.

Chief General Superintendent's Department.

Mr. G. S. Bellamy to be Assistant Superintendent of Motive Power, C.G.S.O., Derby.

Chief Goods Manager's Department.

Mr. G. O. Williams to be Goods Agent, Chester, vice Mr. W. Marshall, retired.

Mr. P. S. Heys to be Goods Agent, Bolton, vice Mr. T. W. Smith, retired.

Mr. J. Livesey to be Goods Agent, Rochdale.

Mr. G. Wood to be Goods Agent, Bury.

* * *

MR. H. STEWART COE, who has been appointed Secretary, Great Southern Railways, as from May 1, joined the service of the former Great Southern & Western Railway in 1887, and took up duty in the audit office, where he served for eight years being then specially selected for a vacancy, in the Secretary's office. When Sir William Goulding became Chairman of his company in 1901, Mr. Coe was promoted to be his confidential assistant, and was again promoted in 1919 to the Chief Clerkship in the Secretary's office. On the amalgamation of the Free State Railways, Mr. Coe continued in the same capacity with the new company. Mr. Coe was a well-known sportsman in his younger days, and founded and organised the present successful Dublin Railway and Steam Packet Social and Athletic Union, of which he was the General Secretary for 15 years.

MR. H. STEWART COE,
Appointed Secretary, Great Southern Railways, Ireland.

* * *

MR. F. A. LARCOMBE, who is retiring from the position of Chief Travelling Auditor, Metropolitan Railway, after completing nearly 54 years' service, during which he served under all the General Managers in the history of that company, entered the Accountant's Department on August 4, 1874, thus creating a record of continuous service so far as this company's headquarters staff is concerned. Further, Mr. Larcombe has held the position of Chief Travelling Auditor for 34 years, having been appointed in 1894, after having been an assistant on the Travelling Audit staff for 17 years.

* * *

MR. V. A. M. ROBERTSON, who has been appointed Civil Engineer to the London

Digitized by Google

Digitized by Google

Underground" Railways, had previously ld the position of District Engineer at ratford, L.N.E.R. He was educated at over College and the Crystal Palace School Engineering. He was articled to Mr. D. ravell, M.Inst.C.E., from 1909 to 1912, orking principally on London & North 'estern Railway work, and at the end of his ipilage entered the service of the South astern & Chatham Railway's new works epartment, leaving in 1919 to join the reat Eastern Railway. Mr. Robertson nlisted as a private in the London Scottish 1914, and was gazetted to the Royal ngineers in 1915. He attained the rank Major in a Field Company, Royal ngineers, and was demobilised in May, 1919, ter three and a half years' continuous rvice in France, where he gained the M.C. nd Bar, and Mention in Despatches. In nuary, 1922, he was appointed by the rectors of the Great Eastern Railway to cceed Mr. E. A. Wilson (who had been ppointed Chief Engineer to the Metropolitan Railway) as Divisional Civil Engineer the Southern Division, which included e whole of the London and suburban area the Great Eastern Railway, and conued to serve in a similar capacity on the rmation of the London & North Eastern ailway in 1923. Mr. Robertson, who was rn in December, 1890, is an Assoc. Member, st.C.E., and a Member of the Institute of ransport. In November, 1924, Mr. Robertn was selected by the L.N.E.R. to comand with the rank of Major, the No. 1 N.E. Railway Platelaying Company, R.E. upp. Reserve). Mr. Robertson raised this nit from amongst the whole of the plateying staff on the railway. The annual aining of this unit takes place at the ailway Training Centre, Longmoor, Hants.

* * *

Mr. W. F. Yates, who has been appointed ivisional Solicitor, Manchester, L.M.S.R., as articled in 1907 to a London firm of licitors, and in 1912 was admitted as a licitor. He then had experience with two ity firms before joining the Army during e war, when he saw service in France and as severely wounded, resigning his comission as Lieutenant in the Royal Artillery 1919. In 1920 he entered L.N.W.R. rvice in the Solicitor's office at Euston, rst in the Conveyancing Department, and ven months later in the Common Law epartment as second assistant. In 1921 e was promoted to be first assistant to the hief Assistant for Common Law matters, ontinuing to hold this position under the M.S.R. until his present appointment as ivisional Solicitor, Manchester, as from larch 1.

Mr. A. Oldham, who has been appointed Signals Assistant to Divisional Engineer, Derby, L.M.S.R., after serving a short apprenticeship with a firm of builders and contractors, entered the service of the London & North Western Railway Company in 1890, and was employed in the locomotive works for a period of two years. He was then transferred to the signal department drawing office and, after several years' service, was appointed head draughtsman of the signal section. During this period Mr. Oldham attended the evening classes of the Crewe Mechanics' Institution and had considerable success in the science examinations. Subsequently, he became chief draughtsman for the electrical, signal and telegraph sections. When Mr. Roberts was appointed Signal Superintendent, Mr. Oldham became his assistant and has served in this capacity for the past 15 years. Mr. Oldham is a Member of the Council of the Institution of Railway Signal Engineers.

* * *

Mr. H. E. Morgan, who has been appointed Signals Assistant to Divisional Engineer, Crewe, L.M.S.R., entered the service of the Taff Vale Railway in 1896 in the Signal Department, and was employed in the drawing office, in the shops, and on the line. In 1902 he entered the service of the then Westinghouse Power Signal Co. Ltd. as a draughtsman, and was engaged on the installation of power and automatic signalling on the Metropolitan District Railway and on electro-pneumatic installations in various parts of the world. In 1905 he joined the W. R. Sykes Interlocking Signal Co. Ltd., and was Resident Engineer on the installation of electro-mechanical signalling for the then new L.B. & S.C.R. station at Victoria, and from 1909 to 1911 was Signal Engineer for that firm, responsible for design, estimating and manufacturing. In 1911 he joined the Midland Railway, serving first as Signal Inspector for the Appleby District, becoming in 1912 Assistant to the Chief Signal Inspector at Derby, and in 1913 Chief Signal Inspector. In 1916 he received a commission in the Royal Engineers and was posted to the 278th Railway Company, R.E., working in the 3rd Army Area on gun spurs and broad gauge lines. In 1917 he was transferred to the 275th Railway Company, R.E., working on lines of communication, &c., and was then appointed to the Signal and Interlocking Company, R.E., and engaged on restoring signalling. He was wounded at Audrieq in September, 1917, and was in hospital until 1919. In the latter year he went to the Railway Training Centre at Longmoor, as officer in charge of the Signalling School and lecturer on block working. In 1922 he

Digitized by Google

returned to Midland Railway service as Chief Assistant to the Signal Superintendent at Derby, a position which he retained until receiving his present appointment. He was elected a member of the Institution of Railway Signal Engineers in 1913, and since 1920 has been a member of council.

* * *

MR. CHARLES H. ELLISON, who retired on April 30 from the position of Telegraph Superintendent of the London & North Eastern Railway (North Eastern Area), was appointed by the directors of the old North Eastern Railway in October, 1902, in succession to the late Mr. Adolphus Graves, who held the post from 1870, in which year the transfer of the telegraphs to the State took place and the railway companies became owners of their own telegraphs. He has seen over 50 years' service, having started in the telegraph department as learner in November, 1877. He was transferred to the General Superintendent's Department on July 1, 1889, and served in various capacities under five different superintendents until October, 1900, when he was appointed by the directors to supervise the working of the telegraphs on the North Eastern Railway, being appointed Telegraph Superintendent two years later, viz., October, 1902. Mr. Ellison was President for 1921-22 of the Institution of Railway Signal Engineers, was elected Vice-President in 1915, and owing to the desirability that no change of officers should be made during the war, he acted as Vice-President for five years.

* * *

WE regret to hear of the death, on April 28, of Mr. Alfred Aslett, J.P., of Ulverston, well known as Secretary and General Manager of the Furness Railway. He was in his 81st year. The funeral took place at Manchester Crematorium on May 1. Mr. Aslett was born in York and educated there and at Peterborough. His railway career began in 1863, with the Great Northern Railway. After 20 years at Nottingham, King's Cross, and other Great Northern stations, he was appointed, in 1884, Manager of the Eastern and Midlands Railway (now Midland & Great Northern Joint Railway). In 1891, Mr. Aslett succeeded Mr. Conacher as Secretary and General Manager of the Cambrian Railways, and in the autumn of 1895 he became General Manager of the Furness Railway, which post he held in conjunction with that of Secretary. Mr. Aslett was a J.P. for the Borough of Barrow-in-Furness; P.P.G. Warden for West Lancashire (Masonic); President of the Barrow-in-Furness Chamber of Commerce and Exchange (1908-12); Chairman of the Furness and Barrow Branch of the R.S.P.C.A.; President of the "Old Petriburgians," a society connected with the ancient educational establishment known as "The King's School," Peterborough. Mr. Aslett retired from his railway positions at the end of April, 1918.

* * *

WE regret to record the death on May 2, at the age of 67, of Mr. William Pickersgill, C.B.E., late Mechanical Engineer, Glasgow, L.M.S.R., formerly Chief Mechanical Engineer, Caledonian Railway, and prior to that Locomotive, Carriage and Wagon Superintendent, Great North of Scotland Railway. He was trained at the Stratford Works of the Great Eastern Railway, in whose service he remained from 1876 to 1894, when he took charge of the Great North of Scotland Railway works at Inverurie. He went to St. Rollox in 1914.

* * *

SIR HERBERT A. WALKER, K.C.B., President of the Association, presided at the sixty-seventh anniversary festival dinner of the United Kingdom Railway Officers' and Servants' Association, which was held at the Trocadero Restaurant on Wednesday, April 18.

* * *

MR. THOMAS ELLIOTT, who retired at the end of April from the position of Commercial Manager, Great Southern Railways, Ireland, entered the service of the Midland Great Western Railway Company in 1889. In 1890 he was transferred to the Manager's Department of that line, and in 1895 was placed in charge of the Trains and Rolling-stock Departments and outdoor arrangements generally. On the reorganisation of staff under Mr. Tatlow's management, Mr. Elliott was appointed Superintendent of the Line on March 1, 1905, and in connection with further reorganisation under the management of Mr. Keogh, became Traffic Manager on January 1, 1914. During the course of his long experience Mr. Elliott has been responsible for special traffic working on a number of occasions, particularly in regard to journeys over the Midland Great Western Railway in connection with Royal visits to Ireland in 1897, 1903 and 1905. Mr. Elliott's appointment as Commercial Manager, consequent upon the amalgamation of railways in the Irish Free State to form the Great Southern Railways, dated from August, 1924.

* * *

MR. H. FERGUSON, who retired in March from the position of Assistant Goods Manager, Southern Area, London & North Eastern Railway, to which he

Digitized by Google

was appointed in May, 1923, was born in 1863, and entered the service of the Great Northern Railway in the Goods Manager's Claims Department in 1876. After a few years' experience in that department he was transferred to the Goods Rates office. Mr. Ferguson was appointed General Inquiry Clerk in 1896, Chief Clerk in 1900, and Assistant Goods Manager in 1903.

* * *

AT the annual dinner of the Ilfracombe Chamber of Trade, the guests, including Lord Mildmay of Flete, a Director of the Great Western Railway, and Mr. E. C. Cox, Chief Operating Superintendent, Southern Railway, it was stated that the Sunday service of trains between London and Ilfracombe would be resumed during the coming summer season for the first time since 1914. Lord Mildmay stated that it was proposed to run two trains on Sundays between Torquay and Ilfracombe, allowing visitors from each resort about six hours at the companion resort. Mr. Cox mentioned that on Monday mornings a train will leave Ilfracombe at 7.40 a.m., due in London at 1 p.m., while the mid-day train from Waterloo would reach Ilfracombe just before 6 p.m. There would also be a train from London at 2.35 p.m.

* * *

THE following appointments have been made by the directors of the Great Western Railway :—

Mr. C. M. Jacobs to be Signal Engineer, in succession to the late Mr. R. J. Insell.

Mr. R. G. Barefoot to be District Traffic Manager, Manchester, *vice* Mr. A. W. Wood, retired.

* * *

MR. HOWARD WILLIAMS, C.B.E., lately General Manager, Central Argentine Railway, has abandoned the Christian name of Howard and will in future be known as Mr. W. Howard-Williams.

* * *

THERE was a large attendance of members of the Railway Students' Association at the London School of Economics on Thursday, April 19, to hear Sir Henry Fowler, K.B.E., Chief Mechanical Engineer, London Midland and Scottish Railway, deliver a lecture on costing methods with particular reference to the railway locomotive shop.

* * *

AT Birmingham, on Thursday, April 19, the Great Western Railway Company exhibited to nearly 1,000 merchants and manufacturers of Birmingham and the Midlands an interesting film of the docks, dock accommodation, equipment, and operations at the ports of the company in South Wales, &c. Mr. Frank Brown, Assistant Chief Docks Manager, gave a brief review of the numerous extensions and improvements which had been carried out by the Great Western Railway since they became, under the operations of the Railways Act of 1921, the owners of the great chain of docks in South Wales.

* * *

THE second annual dinner of the Transport Observation and Models Society was held on Saturday, April 21, Mr. W. Hann, President, in the chair. In the course of the proceedings, the Hon. Secretary, Mr. S. M. W. Hann, reported that the Society had been able to carry out an interesting programme of meetings and visits, and that its membership was increasing, though slowly. He would be very pleased to hear from further prospective members, and to give information to any readers who might wish to write him at "Frensham," Shirley Road, Croydon, Surrey. During the proceedings, short addresses were given by the President; Mr. R. J. Westby, the Chairman of the Society; Mr. J. F. Gairns, Editor of the RAILWAY MAGAZINE and others, while musical selections were given by members and friends.

* * *

ON April 18 the Railway Clearing House Male Voice Choir held the concluding concert of their eighteenth season at the Kingsway Hall, under the conductorship of Mr. John E. West, F.R.A.M., F.R.C.O. Prior to the interval Mr. P. H. Price, Secretary, Railway Clearing House, spoke of the high standard of excellence attained by the choir under Mr. West. This excellence had been recognised by the choir having been asked to assist on more than one occasion at "2 L.O." and at the B.B.C. National Concerts broadcast from the Royal Albert Hall and Queen's Hall.

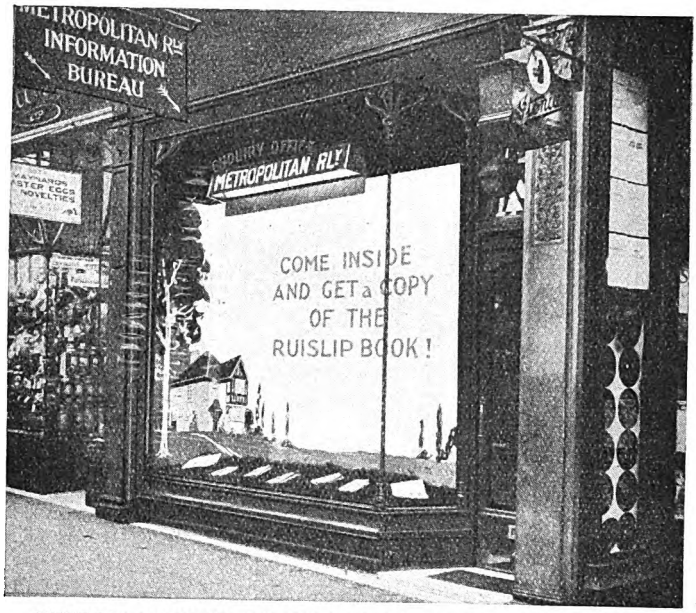
* * *

ON June 18, a lecture will be given by Mr. C. F. Klapper, or "Some Unknown Railways near Wimbledon" to the Wimbledon and District Model Railway Club. As Mr. Greenly was unable to give his promised lecture on April 16, Mr. R. Shephard very kindly took his place at short notice and gave an interesting informal chat on the Romney Hythe & Dymchurch Light Railway, illustrated by Mr. Greenly's lantern slides. The visit to Swindon on April 26 was well attended, and a great success from every point of view. Full information about the club, entry forms, &c., can be obtained from the Hon. Secretary, 27, Bernard Gardens, Wimbledon, S.W.19.

* * *

ANOTHER stage in the Southern Railway's £13,000,000 scheme for the extension of Southampton Docks will be begun shortly, as the result of a contract which the directors

Digitized by Google



WINDOW DISPLAY AT METROPOLITAN RAILWAY BUREAU, LIVERPOOL STREET.

Arranged in connection with publicity campaign for the popularising of Ruislip as a residential district.

have just placed with the James' Dredging Company. The work included in this contract involves the dredging to a depth of about 35 ft. of a portion of the Approach Channel, the swinging ground in which vessels will turn on entering and leaving the port, and the berths alongside the new quay, together with the reclamation of about 170 acres of mudlands on the west. The work will take about four years to complete.

* * *

THE L.N.E.R. are to carry out signalling and other alterations at the north and south signal-boxes situated at each end of Sunderland station, in order to enable the whole of the work to be performed from the south box. It is proposed to substitute two-phase colour light signals for the existing light signals located in the tunnel at the north end of the station, and to introduce route indicator signals, and replace miniature shunt signals by ground discs.

* * *

FLOODING of a railway track near Orillia, Ontario, Canada, enabled an unique race to be reported, the contestants being "Chief Big Wind" of the local Indian Reserve, who paddled a canoe along the railway track, which was under water for about 2 miles, and a train proceeding cautiously behind.

* * *

THE Southern Railway has concluded arrangements with the Belgian authorities for the issue of week-end tickets to various Belgian coastal resorts without necessity for the traveller securing a passport for the journey. Similar tickets will be issued every week-end from London to Ypres *via* Dover and Ostend, to enable ex-Servicemen and their relatives to visit the Menin Gate or the other war memorials in the neighbourhood.

* * *

"PERIOD" excursion tickets are now issued by the Southern Railway on Mondays as well as Fridays. These Monday tickets are available between London and numerous resorts in Kent and Sussex, also Southampton, Bournemouth, and the Isle of Wight. Passengers travel on the outward journey by specified trains. The tickets are available for return on either the fifth or twelfth day, *i.e.*, on the following Friday or Friday week.

* * *

ON Monday, April 16, the L.N.E.R. conveyed an octagonal ingot weighing 112 tons from Sheffield to Openshaw. The ingot was 11 ft. 11 in. long, 7 ft. 9½ in. in diameter at one end and 7 ft. 5 in. in diameter at the other end, and was loaded on to two 60-ton six-wheeled bogie armour-plate wagons, fitted with cradle. Under this arrangement the weight was so distributed that the axle load was only 14 tons 6 cwt.

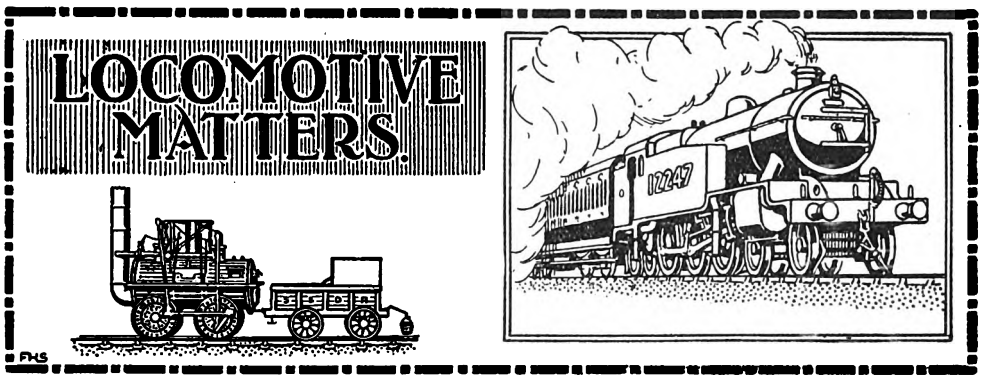
* * *

A CONCESSION to cyclists while travelling by train with their machines is announced by the Railway Clearing House. Return tickets are now issued to passengers for bicycles for distances not exceeding 15 miles outward journey at single rate for the double journey, at owners' risk.

* * *

AT the annual Van Horse Parade, held on Easter Monday in Regent's Park, 13 of the London & North Eastern Railway parcels team were entered, and 11 first-class awards and two second-class awards were obtained. The entries totalled 657, an increase of 53 over last year, and the prizes were distributed by Her Grace the Duchess of Somerset.

Digitized by Google



Under this heading will be inserted short references to news items relating to locomotive engines and their duties. It must be understood, however, that information as to the stations of particular engines cannot be given, for the reason that, before the date of publication, transfers may have taken place, while lists of engines, &c., debarred from "The Why and the Wherefore" section, cannot be included under this heading. With this understanding, notes as to matters thought to be of general interest will be welcomed.

RECENTLY the numbers of locomotives of each wheel type (with other particulars) were given under the respective railways. Mr. E. Maxwell has, however, sent interesting tables correlating the same particulars and associating engines of the same type for the four group railways with the Metropolitan, and this is reproduced with due acknowledgment to our correspondent. There are three tables, the first covering tender engines, is given below :—

The second deals with tank engines. To these must be added 6 (2-6-4), 2 (0-6-0), 4 (0-6-2), 4 (0-6-4), 8 (4-4-4), 7 (4-4-0), and 7 (0-4-4) steam engines on the Metropolitan Railway, so that the grand totals for these wheel types are: 53 (2-6-4), 3,642 (0-6-0), 1,755 (0-6-2), 85 (0-6-4), 54 (4-4-4), 75 (4-4-0), 954 (0-4-4), and 9,319 of all types.

This table appears overleaf.

Mr. Maxwell has completed his task by correlating engines, rail motor cars, and electric rolling-stock on a general basis, adding the Metropolitan and Metropolitan District figures as given on the next page.

This section is involving very heavy correspondence, and it is necessary to restrict to some extent the information which can be given. Thus, while we appreciate the interest and enthusiasm of readers

ANALYSIS OF TENDER LOCOMOTIVES IN SERVICE AT THE END OF 1927.

Type.	G.W.R.	L.M.S.R.	L.N.E.R.	S.R.	Total.
0-10-0	—	1	—	—	1
2-8-2	—	—	2	—	2
2-8-0	192	44	418	—	654
0-8-0	2	801	378	—	1,181
4-6-2	—	—	57	—	57
4-6-0	197	911	305	145	1,558
2-6-0	404	116	145	83	748
0-6-0	327	3,541	2,222	292	6,382
4-4-2	1	26	239	11	277
4-4-0	344	1,192	885	545	2,966
2-4-0	39	249	96	—	384
0-4-2	—	35	—	106	141
4-2-2	—	4	—	1	5
2-8-0—0-8-2	—	—	1	—	1
2-6-0—0-6-2	—	3	—	—	3
Totals	1,506	6,923	4,748	1,183	14,360
Tenders	1,529	6,920	4,783	1,183	14,415

Digitized by Google

ANALYSIS OF TANK ENGINES IN SERVICE AT THE END OF 1927.

Type.	G.W.R.	L.M.S.R.	L.N.E.R.	S.R.	Total.
4–8–0	—	—	15	4	19
2–8–0	175	—	—	—	175
0–8–0	—	6	—	—	6
0–8–2	9	31	36	—	76
0–8–4	—	30	4	—	34
4–6–4	—	29	—	7	36
4–6–2	—	59	74	7	140
2–6–4	—	6	20	21	47
2–6–2	250	—	—	4	254
0–6–0	1,195	1,267	1,014	164	3,640
0–6–2	481	454	678	138	1,751
0–6–4	3	64	9	5	81
4–4–4	1	—	45	—	46
4–4–2	30	157	163	66	416
4–4–0	—	53	15	—	68
2–4–2	43	516	313	1	873
2–4–0	122	20	—	7	149
0–4–0	32	120	80	29	261
0–4–2	155	23	4	76	258
0–4–4	5	370	201	371	947
2–2–4	—	—	4	—	4
Totals	2,501	3,205	2,675	900	9,281

ANALYSIS OF ELECTRIC STOCK IN SERVICE AT THE END OF 1927.

——	M.R.*	M.D.R.†	G.W.R.	L.M.S.R.	L.N.E.R.	S.R.	Total.
Tender engines	—	—	1,506	6,923	4,748	1,183	14,360
Tank engines	38	—	2,501	3,205	2,675	900	9,319
Rail motor cars	—	—	39	37	9	—	85
Electric locomotives	20	7	—	2	13	—	42
Electric coaches	193	272	20	301	86	576	1,448
Departmental, &c., engines ..	1	4	—	48	19	8	80
Grand total	252	283	4,066	10,516	7,550	2,667	25,334

* Metropolitan Railway Company.
† Metropolitan District Railway Company.

who send lists of engines seen at various places, working in specified districts, and attached to particular sheds, this information can only be utilised where unusual engines are concerned, or some other exceptional factor is involved. Similarly, while the rule that lists of engines of particular classes cannot be given has not been strictly adhered to, it must be explained that such lists can only be supplied very occasionally, and then only where information is likely to be of general interest. In any case, we cannot set out to provide a means whereby compilers of lists can fill up gaps. In the same way, we must ask readers to refrain from asking for details of locomotive renumbering. If space had permitted, we should have given this information long ago. As it is, space in this section is necessarily restricted, and if readers will bear this fact in mind, remembering also that accuracy of observation is essential, it will facilitate the handling of material for "Locomotive Matters," while there should be no loss of generally interesting subject matter. Readers will remember that while all letters are given careful consideration, and much of the information is most acceptable, selected items only can be utilised. Further, in many cases the same information is given

Digitized by Google

by several readers, and it is not always practicable to give credit to everyone concerned.

L.M.S.R.

We are advised officially that two of the "Royal Scot" names given in the April number have been changed, No. 6124 being *London Scottish* and No. 6125 *Lancashire Witch*. There are thus 25 engines with regimental names, and 25 with names of early historic locomotives.

L. & Y. 4-4-0 No. 10122 has been noted rebuilt with Belpaire boiler. L.N.W. "Princes" Nos. 5796-5799 are at Farnley and Wortley (17) shed. "George," 4-4-0 No. 5322 *F. S. P. Wolferstan* has a Belpaire boiler and pop safety valves.—["MOONSTONE."]

Locomotives recently scrapped include late G.S.W. Nos. 14141 (4-4-0) and 17200 and 17108 (0-6-0), and late C.R. No. 14296 (4-4-0, formerly 1124 *Eglinton*). East Kilbride trains working temporarily to St. Enoch, Glasgow, during repairs to the Central station, Clyde Bridge, have been worked by the usual Cal. 0-4-4 tank engines. —[J. F. McEWAN.]

L. & Y. 2-4-2T Nos. 10659, 10694, 10697, 10700, 10719, 10743, 10748, 10773, and 10809 are at Huddersfield, L.N.W. (20) shed. Midland 2-4-0 No. 250 has been working the official inspection saloon on the L. & Y. section.—[H. SCOTT and A. P. HERBERT.]

2-6-4T, Nos. 2307-9, are at Nottingham (Mid. 18) shed. The only remaining 4-2-2 engine, No. 600, is also there.—[J. N. HALL.]

L. & Y. 4-4-0 No. 10136 was recently noted at Preston piloting L.N.W. "Claughton" No. 5978 on train from Carlisle.—["L. Y. R."]

L.N.W. "Claughtons" at Leeds (Mid.), and working between Leeds and Carlisle, include Nos. 5944 and 6005. Mid. 4-4-0 No. 731 (at Sheffield) is running painted black.—[A. P. HERBERT.]

4-6-0 No. 5617 is a "Prince" class, not a "Claughton," as stated on page 311 of the April number.—[C. G. WOODNUTT and "FALABA."]

Cleator and Workington 0-6-0T No. 11567 still bore the name *Millgrove* when seen last year. Presumably others of the same class are or were named. Two of these engines are still running, the other one being No. 11568 *Skiddaw*. Three others, now scrapped, were Nos. 11564 *Brigham Hall*, 11565 *Ponsonby Hall*, and 11566 *Hutton Hall*.—[C. WILLIAMS.]

A train of four coaches between Rugby and Crewe was noted headed by "Royal Scots" Nos. 6111 and 6113, obviously a case of meeting engine duty or other requirements.—["F. V. W."]

2-6-4T No. 2305 has been noted on the Leeds-Carnforth route.—[E. G. CHAPMAN.]

Compound 4-4-0's Nos. 901 and 905 have been noted on the Glasgow-Ardrossan route. —[J. B. MAITLAND COWAN.]

2-6-4T Nos. 2310-17 are at Longsight, Manchester. (See also below.) 4-6-4T Nos. 11115 and 11118 (apparently returned from London) and Nos. 11114, 11116, 11117, and 11119 are also in Manchester. 0-6-0 No. 8496 (old No. 1239) now works the engineer's saloon in place of *Engineer Manchester*, scrapped.—[W. QUINTON, C. INGLEBY, and G. C. WILSON.]

"Claughton's" Nos. 5992-5998, are at Holyhead (22), No. 5948 is at Llandudno Junction, and Nos. 5956-7 at Preston.—[C. WILLIAMS.]

New 2-6-4 passenger tank No. 2310 ex Derby (which was referred to in the April issue) is now stationed at Longsight, together with Nos. 2311-19 of the same type, all of which have come from Derby Works. Of the above engines, Nos. 2310, 2311 and 2314 are red, and Nos. 2312 and 2313 are black, all others probably being red. No. 2313 is interesting in that it is named *The Prince*. This engine, then just completed, received its name in commemoration of the Prince of Wales' recent visit to Derby. No. 16592 is the latest 0-6-0 shunting tank ex Vulcan Foundry. Similar engines delivered by Messrs. Beardmore's bear Nos. 16600-14. Eight others from the Hunslet Company have been put into traffic, Nos. 16640-7. Five 0-6-0 superheater goods engines will shortly be put in hand at Crewe, Nos. 4507-11. "Claughton" class 4-6-0 No. 5999 "Vindictive" (old No. 2430) has been rebuilt with a large boiler, but retaining the original Walschaert's motion. Owing to the increased height of the new boiler, the chimney and dome have been considerably reduced in size, whilst the power classification, which previously was 5, is now 5X. Painted red and numbered and lettered in the new style, No. 5999 is at present working from Crewe North shed, though normally it is attached to Edge Hill depot. Other "Claughton's" similarly rebuilt but not yet in traffic are Nos. 5953 *Buckingham*, 5972, 5986 and 6017 *Breadalbane*. (In the order given these engines were previously L.N.W. Nos. 986, 1726, 1092 and 196). The next rebuild, No. 6029 (old No. 1220), will be fitted with Caprotti valve gear. Two other "Claughtons," Nos. 5926 and 5943 (old Nos. 2204 and 2373), have been fitted with reduced chimneys, the latter in addition having a smoke deflector. There are now 48 "Princes" stationed at Crewe, Nos. 5605-5651 and

Digitized by Google

5845. Walsall has the first two of the series, Nos. 5600-1 and Warrington the next three, Nos. 5602-4. It is, of course, impossible to record the stations of engines accurately, as they are being shifted about so frequently. "Royal Scot" class engines Nos. 6114-8 are now stationed at Camden to meet additional through workings to Carlisle, of which there are two, at least. Class "D" 0-8-0's Nos. 9004 and 9012 (old Nos. 2548 and 2547) have been converted to class "G1" (superheater). 0-8-0's Nos. 9249 and 9397 are running with ex L. & Y. eight-wheeled tenders attached. Recent withdrawals include No. 1974 *Howe*, the last remaining 4-4-0. Webb compound; No. 1650 *Trevithick*, "Precursor" class 4-4-0 and No. 2624 *Saracen*, "Experiment" class 4-6-0. Three additional 2-8-0 "M.M." engines have been reconditioned and turned out at Crewe, viz., Nos. 9662-4. In the (late) R.O.D. list these engines were numbered 1801, 1888 and 1918 respectively. [C. WILLIAMS.]

A new 4-4-0 No. 563, Class "2P," apparently of a new design, has been noted at Derby.—[F. BROWN.]

With regard to Nos. 3617, 3716 and 3761, concerning which there appears to be some confusion as to the application of remarks previously given, there is no doubt that No. 3716 is the engine in question. This has been converted from Class "3" to Class "2."—[C. W.]

L.N.W. 4-6-2T's Nos. 6967-8-9 were recently noted at the same time at London Road, Manchester, all waiting to take trains out.—[R. DYSON.]

L.N.W. 0-8-0 No. 9321 has been noted with a new Midland type tender. 0-6-0 No. 12380, formerly L. & Y. No. 683, built at Horwich in 1898, has been noted at Edgehill, Liverpool. A "Royal Scot" and a "Claughton" were noted together on a train, though obviously to meet traffic needs.—[E. S. APPLEBAUM.]

2-6-4T's Nos. 2307-8-9 and 0-6-4T's Nos. 2015 and 2018-9 are at Nottingham.—[E. J. F. and G. B. WHEATLEY.]

An early "Johnson" rebuilt 4-4-0, No. 718, recently brought an excursion train into Euston.—["5466 GLENDOWER."]

Cal. 4-4-0 No. 14337 has been returned to service painted black, though No. 14437 has only just appeared in red livery.—["DUNALASTAIR" and "CARDEAN."]

Midland 4-4-0's Nos. 383, 401, 402 and 727 with L. & Y. 4-4-0 No. 1101 and 4-4-2's Nos. 737, 1405 and 1420, are working between York and Manchester and Liverpool. Mid. 2-4-0's Nos. 195 and 220 are also working on the L. & Y. section. Furness 0-6-0's Nos. 12472 and 12476, from Carnforth, have been noted in the Normanton district.—[H. SCOTT.]

For the visit of the King and Queen of Afghanistan to Manchester, six coaches of the late L.N.W. royal train were worked by compound 4-4-0 No. 1022, repainted in new livery.—[J. H. WOOLLEY.]

L.N.E.R.

D "49" class 4-4-0's at Neville Hill, Leeds include Nos. 236 *Lancashire*, 245 *Lincolnshire*, 251 *Derbyshire*, 253 *Oxfordshire* and 256 *Hertfordshire*. No. 234 *Yorkshire* is expected. Most, if not all, Class "Z" Leeds 4-4-2's have been transferred to Tweedmouth.—[A. P. HERBERT.]

N.E. 4-cyl. compound No. 731 has been noted on Newcastle-Liverpool expresses *via* York.—[S. WILKINSON.]

Further "D49" class 4-4-0's are Nos. 307 *Kincardineshire*, 309 *Banffshire* and 318 *Cambridgeshire*. No. 318 has outside exhaust pipes as on the 4-6-2 and 2-6-0 engines. No. 1412, the last of the 398 (N.E.R.) class, has been withdrawn, also 2-4-0 No. 1479. There are now only five N.E. 2-4-0's at work, Nos. 1464-5 at Barnard Castle, 1468 at York, and 1473 and 1477 at Kirkby Stephen. H. & B. 0-6-2T has been shunting at Ferryhill. H. & B. Nos. 2512, 2501, 2516, 2472 and 2444 have been fitted with domed boilers. N.E. engines withdrawn last year included Nos. 59, 78, 87, 96, 171, 197, 198, 235, 247, 273, 323, 343, 388, 422, 455, 465, 488, 522, 605, 618, 620, 636, 991, 1059, 1087, 1097, 1453, 1463, 1469, 1471, 1480, 1482, 1483, 1504, 1505, and 1628.—[J. W. ARMSTRONG.]

Foreign engines recently noted at King's Cross included two N.E.R. 4-4-0's of the "R1" class, G.E. No. 8812 and G.C. 4-6-0 No. 5482.—[G. R. GRIGS.]

G.E. 0-6-0 No. 07039, the subject of several recent enquiries, is now at Sudbury.—[H. N. WOOLHOUSE.]

Booster-fitted 4-4-2 No. 4419, after overhaul, has now been definitely allocated to main-line service and is at Grantham. She has worked loads of 440 tons to time and has taken 500 tons.—[R. A. H. W.]

The Kitson-Still engine (Kitson & Co. Ltd.) recently worked a test train between Leeds and Wakefield. Can any reader supply numbers of G.E. rebuilt 4-4-0's still in service?—["CLAUD 8810."]

G.E. 0-6-0T's Nos. 7337, 7342, 7348, 7356, 7375–6 and 7391–2 are in the Glasgow district.—[A. KENNEDY.]

"J39" class 0-6-0's are Nos. 1448–1452, 1454–1459, 1481, 1484, 1492–1498. No. 1453, previously mentioned, was a "398" class engine scrapped last year.—[J. G. B.]

Digitized by Google

Numbers of G.C. type 2-6-4T engines would be appreciated. Twelve are known, but the class includes 20 engines.—[G. B. WHEATLEY.]

Most of the G.N. 0-8-2T engines are now at Colwick. Old Sacré 4-4-0 engines noted in the Nottingham district include Nos. 6464 (black) and 6466 (green). H. & B. 0-6-0's noted in this district include Nos. 2411, 2455 and 2458, with 0-8-0 No. 2502. G.E. 4-6-0 No. 8547 recently worked to Nottingham with a football special.—[R. A. STANIFORTH.]

G.N. 4-4-0 No. 3041 worked to Southend on Easter Monday.—[F. LEMMON.]

G.N. 2-6-0's noted at Liverpool Street were Nos. 4644, 4650, 4652, 4662 and 4690. ["PAIGNTON."]

Among other than G.N. engines now attached to Doncaster, or at sheds under Doncaster oversight, are N.E. 4-6-2T's Nos. 1129 and 1190; 0-6-0's Nos. 1233, 1255, 1259, 1263, 1265–1270, 1272–1275, 1277, 1281–2, 1286–1290, 1295–6, 1298 and 1484, 1492–1498; 4-6-0 No. 746; L.D.E.C. 0-6-2T's Nos. 5040–1–2–3, 5066, 6154, 6163, 6412–3–4 and 0-6-4T Nos. 6145–6153; E. & W.Y. Union 0-6-0T's Nos. 3112–3–4 and 0-6-2T No. 3115. New 0-6-2T's to No. 2616 are now in service on the G.E. section. 4-6-2 No. 2544 has been fitted with a high-pressure boiler. These engines are now classed "A3." G.N. S.T. No. 3611 is to be scrapped. It is believed to be the only G.N. engine to complete 50 years' service practically in its original condition.

G.E. 4-4-0 No. 7732 was recently noted at Leicester (L.M.S.) presumably on a race special from Newmarket.—[B.M./Z.M.J.S.]

0-6-2T Nos. 4553, 4577, 4583 and 4585, and a number of S.T. engines have been fitted with Ross safety valves.—["5466 GLENDOWER."]

Latest "D49" class from Darlington works are 310 *Kinrosshire* and 311 *Peebleshire*; and "D49/2," 320 *Warwickshire*. Nos. 2573 *Harvester*, 2569 *Gladiateur*, and 2580 *Shotover* have had corridor tenders fitted. G.E. section 0-6-0's Nos. 8145, 8146, 8195, 8242 and 8248 have come to Darlington for overhaul. Engines Nos. 60, 506 and 1477 have been withdrawn for scrap. In reply to the query *re* L.N.E. 2-2-4T, No. 668 should read 66 *Aerolite*, and the others are 190 (sister engine to 1679), Heaton Shed, and 957 (rebuilt from "B.T.P." class) at Hull Shed.—[J. W. ARMSTRONG.]

The following Gresley Pacifics have been fitted with corridor tenders and stationed at King's Cross for Edinburgh non-stop working: 4472 *Flying Scotsman*, 4476 *Royal Lancer*, and 2547 *Doncaster*. No. 2580 *Shotover*, with high-pressure boiler, was the first similarly provided engine to work through from Edinburgh to London during the preliminary trials at the end of April. G.C. "Director" class 4-4-0 No. 5501 *Mons* has been working in the Leeds G.N. "Pullman link." In connection with the Grand National Steeplechase on March 30, King's Cross Pacific 2546 *Donovan*, Driver Glasgow, worked a Pullman car special throughout from King's Cross to Aintree and back, *via* Retford and G.C. and C.L.C. systems. Two Hull half-day excursions to King's Cross and back on March 24 were worked by two pairs of N.E. 4-4-0 locomotives throughout, viz., 1622 and 1239; 1633 and 1245. They were both heavy trains and included a number of dining cars. Several special trains from Scotland in connection with the Association International match on March 31 were hauled variously by two N.E. 4-4-2, N.E. 4-4-2 and 4-4-0, and N.E. 4-4-2 piloted by G.N. 4-4-0 locomotives. The numbers of the N.E. engines concerned were 2196, 1207, 2104, 2209, 2203, 2198, 1794, 736, 2030 and 2197. Several more "K2" class 2-6-0 locomotives have been transferred from G.N. to G.E. section and have been fitted with the Westinghouse brake.—[R. A. H. W.]

Three G.C. engines were noted to King's Cross at the same time:—4-6-2T No. 5448, 4-6-0 No. 5073 and 4-4-0 No. 5506 *Butler-Henderson*.—[S. H. MOULD.]

No. 270 is *Argyllshire* not *Fifeshire* as stated. No. 264 *Stirlingshire* worked the first up "Queen of Scots" from Glasgow.—[J. A. HODGE.]

G.W.R.

In view of the fact that changes were made in some of the names given to "Castle" class engines, which probably accounts for certain discrepancies in statements given in "Locomotive Matters" we give, on the authority of a reader on whose initiative some of the changes were, we understand, made, a complete list of these engines as now running.

4073	*Caerphilly Castle*	4090	*Dorchester Castle*
4074	*Caldicot Castle*	4091	*Dudley Castle*
4075	*Cardiff Castle*	4092	*Dunraven Castle*
4076	*Carmarthen Castle*	4093	*Dunster Castle*
4077	*Chepstow Castle*	4094	*Dynevor Castle*
4078	*Pembroke Castle*	4095	*Harlech Castle*
4079	*Pendennis Castle*	4096	*Highclere Castle*
4080	*Powderham Castle*	4097	*Kenilworth Castle*
4081	*Warwick Castle*	4098	*Kidwelly Castle*
4082	*Windsor Castle*	4099	*Kilgerran Castle*
4083	*Abbotsbury Castle*	5000	*Launceston Castle*
4084	*Aberystwyth Castle*	5001	*Llandovery Castle*
4085	*Berkeley Castle*	5002	*Ludlow Castle*
4086	*Builth Castle*	5003	*Lulworth Castle*
4087	*Cardigan Castle*	5004	*Llanstephan Castle*
4088	*Dartmouth Castle*		
4089	*Donnington Castle*	5005	*Manorbier Castle*

Digitized by Google

5006 *Tregenna Castle*
5007 *Rougemont Castle*
5008 *Raglan Castle*
5009 *Shrewsbury Castle*
5010 *Restormel Castle*
5011 *Tintagel Castle*
5012 *Berry Pomeroy Castle*

LOCOMOTIVES OF OTHER CLASSES REBUILT AS "CASTLES."

111 *Viscount Churchill.*
4009 *Shooting Star.*
4016 *Knight of the Golden Fleece.*
4032 *Queen Alexandra.*
4037 *Queen Phillipa.*

New 0-6-2T Nos. 6627-9 are now in service. 4-4-0's Nos. 3803 *County Cork*, 3811 *County of Bucks* and 3829 *County of Merioneth* are now at Oxford. "Bulldog" 4-4-0 No. 3361 is now at Southall.—[F. J. T.]

An old Mersey 2-6-2T, bought by the Alexandra Docks Railway and numbered G.W.R. 1199, is at Alexandra Docks shed out of service. Ex B. & M. 0-6-2T No. 39 (G.W.R. No. 504) is also at Alexandra Docks.—[A. KENNEDY.]

Paddington-Birkenhead "Grand National" specials were worked by No. 4092 *Dunraven Castle* and No. 5010 *Restormel Castle*.—[G. W. L.]

No. 6009 *King Charles II* is now in service. Also No. 6012 *King Edward VI*.—[G. R. GRIGS and F. J. T.]

The following engines have been turned out of Swindon Works since February 9: Passenger 4-6-0, No. 6006 *King George I* and No. 6007 *King William III*. Goods 0-6-2T, No. 6629.—[G. W. R. MAGAZINE.]

Two-cylinder 4-6-0's of the "29XX" class are now used on the Berks and Wilts line, instead of "County" 4-4-0's. No. 2946 *Langford Court* very unusually worked the second part of the "Cornish Riviera" express.—[D. S. F. GUDGIN.]

"King" class 4-6-0's work the 10.30 a.m., 1.30 and 3.30 p.m. trains to Plymouth, the 12 noon to Newton Abbot, the 3.15 p.m. to Swindon and occasionally the 6.35 p.m. to Swindon. Apparently some of the "83XX" 2-6-0's are "53XX" engines altered somewhat at the front end and given a heavier classification. 2-6-2T No. 5145 has been similarly treated.—[R. WEBSTER.]

G.W.R. 4-6-0's Nos. 2985 *Peveril of the Peak*, 2949 *Stanford Court*, and 2921 *Saint Dunstan* recently worked to Nottingham on football specials.—[R. A. STANIFORTH.]

4-6-0's Nos. 4073 *Caerphilly Castle* and 4086 *Builth Castle* now have Ross pop safety valves. Large 2-6-2T engines now work semi-fast trains between Bristol and Weston-super-Mare.—[T. G. TUTIN and R. H. DALE.]

A West of England express recently arrived at Paddington hauled by No. 2983 *Redgauntlet* and No. 6000 *King George V*. Obviously the former engine was attached to meet traffic needs, as the load was not excessive.—["5466 GLENDOWER."]

Presumably the 20 locomotives of the "4900" or "Saint Martin" class, the pending construction of which is announced in the *Great Western Railway Magazine* for May, will be similar to the locomotive of that name which was originally one of the 20 engines of the "Saint" class, but which was rebuilt some three years ago with driving wheels 6 ft. in diameter instead of 6 ft. 8½ in.—[L. B. HEWITT.]

S.R.

"KING ARTHUR" 4-6-0's on Victoria-Brighton service are Nos. E 793-E 806. Engines on London Bridge-Brighton turns are 4-6-4T, 4-4-2 and 4-4-0 (B.4X). 4-6-4T Nos. B.327, B.333 *Remembrance*, and 4-6-2T No. B.326 have, however, been noted on "The Southern Belle." The "City Limited" is generally worked by a 4-6-4T. Brighton-Ashford trains are often worked by Stroudley 0-4-2's and Stirling 4-4-0's, also occasionally "L" class 4-4-0's. Ashford "L" and "L1" class 4-4-0's are repaired at Brighton and are frequently used on western routes before return. Stroudley 0-4-2's, "B" section 4-4-0's, and occasionally "E" section 4-4-0's, also 0-4-2 No. E.608, are also used on these lines. Worthing, Bognor and Littlehampton duties are generally provided by 0-4-4T's. 4-4-2 express tank engines frequently work London secondary trains. A recently noted rare visitor was the rebuilt 4-4-2T No. B.596. Re information given recently by Mr. Geoffrey Haly as to 4-4-2 "B" section tank engines, it may be pointed out that the parts from other engines utilised for the "I1" class were mostly from 0-4-2 tender engines (mixed traffic) and only in a few instances from "D 1" tank engines. The "I 3" class (No. B.22) have 6 ft. 7½ in. coupled wheels, but No. B.21 (virtually a B.4 tender design adapted) has 6 ft. 9 in. coupled wheels. The smokebox is, further, not supported on a saddle casting as in the case of "I 3" engines. Nos. B.22-30 and B. 75-91 have 6 ft. 7½ in. wheels and most have 21-in. cylinders. B.34 is a "I 4" tank generally similar to Nos. B.11-20 (I 2), but with superheater and piston valves. Nos. B.11-20 and B.31-35 (classes "I 2" and "I 4") are considerably more powerful than the "I.1" class, originally modelled on the G.N. 4-4-2T's, and others work main-line trains. No. B.601 (4-4-2T, class "I 1") is the seventh to be rebuilt as class "I 1X."—[R. S. PALMER.]

The special train bringing the King of Afghanistan from Dover to Victoria on March 13 was composed of four Pullman cars and two L.S.W.R. corridor vans, worked by 4-4-0 No. A.772, an unusual visitor to Victoria.—[E. A. GURNEY-SMITH, F.K.L., "745 Tintagel," and J. H. DONOHUE.]

Digitized by Google

Kirtley 0-4-4T's Nos. A.658 and A.665 are at West Marina (St. Leonard's).—["CURIOUS."]

The complete list of "Lord Nelson" 4-6-0's, when placed in service, will be: E.850 *Lord Nelson*, E.851 *Lord St. Vincent*, E.852 *Lord Hood*, E.853 *Lord Hawke*, E.854 *Howard of Effingham*, E.855 *Sir Francis Drake*, E.856 *Sir Richard Grenville*, E.857 *Sir Walter Raleigh*, E.858 *Robert Blake*, E.859 *Lord Howe*, and E.860 *Lord Duncan*.—[A. G. THOMAS and P. ROOS.]

Earl Haig's funeral train was worked from Waterloo by 0-4-4T No. E.105, not E.106 as stated. The train travelled *via* Latchmere Junction to Addison Road, the old connection (disused) being restored for the occasion.—[J. H. DONOHUE and E. J. NORRIS.]

2-6-4T Nos. A790–A796 are being converted to 2-6-0 tender engines at Eastleigh, Nos. A797–A802, A805 and A890 at Ashford, and Nos. A803, A804, and A806–A809 at Brighton. No. A805 has been noted in service in this form. The new "Lord Nelson" class engines will have eight-wheeled tenders off "King Arthur" class engines Nos. E763–E772, the latter receiving six-wheeled tenders. All the 4-2-2-0 engines are now scrapped. Recently, 4-6-0 No. EO449 had E371's old tender as No. E449 was running with that of EO449.—[F. K. L. and "745 TINTAGEL."]

E385 is a 4-4-0 not a 0-6-0 as stated in the March number.—[G. WOODWARD.]

Trains passing one another at Sevenoaks (Tubs Hill) recently were worked by 4-4-0 No. A770 and 4-6-0 No. E770.—["PAIGNTON."]

"King Arthur" 4-6-0's noted in the Eastbourne district include No. E795 *Sir Dinidan*, E799 *Sir Ironside*, E796 *Sir Dodinas le Savage*, and E802 *Sir Dumore*.—[A. C. TODD.]

On Easter Sunday the 10.45 and 11 a.m. Continental trains were worked together by No. E765 *Sir Gareth*, the load being 15 vehicles. No. E769 *Sir Valence* worked the same load on the return journey.—[F. K. L.]

Eight 3-cyl. 0-8-0T engines are under construction at Brighton.—["A222."]

An electric train recently ran from London Bridge to East Croydon in 13 minutes (48 m.p.h.), involving a wait of 8 minutes for time.—[R. NEWMAN.]

The following is a list of "A" section classes:—

A	4-4-0	6-ft. class (all scrapped).
(A, A1 and A2 0-4-4T, Kirtley all scrapped.)		
B	4-4-0	Stirling "440" domeless.
B1	4-4-0	"440" rebuilt with domes.
(B1 0-6-0 Kirtley all scrapped.)		
B2	0-6-0	Kirtley.
C	0-6-0	Wainwright.
D	4-4-0	Wainwright "726."
D1	4-4-0	Maunsell rebuilds.
E	4-4-0	Wainwright "516."
E1	4-4-0	Maunsell rebuilds.
F	4-4-0	Stirling "240" domeless.
F1	4-4-0	"240" rebuilt with dome.
G	4-4-0	G.N.S. type, all scrapped.
H	0-4-4T	Wainwright.
J	0-6-4T	Wainwright.
K	2-6-4T	"River" class.*
K1	2-6-4T	*River Frome* (3-cylinder).*
L	4-4-0	Wainwright "760."
L	4-4-0	New Maunsell.
(M1 and M2 4-4-0 Kirtley all scrapped.)		
M3	4-4-0	Kirtley.
N	2-6-0	Maunsell "810."
N1	2-6-0	No. 822 (3-cylinder).
O	0-6-0	Stirling domeless.
O1	0-6-0	Rebuilds with domes.
P	0-6–0T	Wainwright "555."
Q	0-4-4T	Stirling domeless.
Q1	0-4-4T	Stirling rebuilt with dome.
R	0-4-4T	Kirtley.
R	0-6-0T	Stirling domeless.
R1	0-4-4T	Kirtley.
R1	0-6-0T	Stirling rebuilt with dome.
S	0-6-0T	Maunsell rebuilt. No. 685.
T	0-6-0T	Kirtley "600."

—["TAMERLANE."]

M. and G.N.J.R.

The M. and G.N. 4-4-0's are of two distinct types. One type has 6-ft. driving wheels and outside cylinders, while the other has 6-ft. 6-in. driving wheels and inside cylinders. Ten engines of the latter type have been rebuilt with large Belpaire boilers, and are numbered 39, 45, 46 and 51-57.

The 0-6-0's are also of two types, viz., Great Northern and Midland, and a few engines of the latter type have been fitted with Belpaire boilers. The remaining engines comprise three 4-4-2T's, several 0-6-0T's and one or two 4-4-0T's, all having outside cylinders.—["CONSOLIDATION."]

Irish Railways.

M.G.W. 2-4-0 *Aurora* has been again withdrawn from the Eastern Section. 4-4-0 No. 451 (old D.S.E. No. 56) has been sent to Wexford shed and is again at work on main-line passenger trains. 2-6-0 No. 16 (formerly D.S.E.) was taken off the night goods shortly after the new year, and was replaced by 0-6-0 211, which formerly worked on this service. 2-6-0 No. 461 is now engaged with 211 on this goods service. 4-4-0 No. 94 works to Bray frequently on passenger trains from

* Now 2-6-0 tender.

Digitized by Google

Wexford. 0-6-0's Nos. 446-7 and D.S.E. No. 4 work on the "day" goods regularly. Nos. 432, 435 (2-4-2T) have not been in service for some time; also 2-4-0T No. 425. 0-4-4T 279 recently returned to Grand Canal Street shed after a long absence.—[C. J. COGHLAN.]

Great Southern Railway's engines lately re-numbered include the following:—No. 462, 2-6-0, formerly D.S.E.R. No. 16; No. 556, 0-6-0T, formerly M.G.W.R. No. 111 *Wasp*; No. 594, 0-6-0, formerly M.G.W.R. No. 55 *Inny*; No. 599, 0-6-0, formerly M.G.W.R. No. 60 *Lough Owel*; No. 639, 0-6-0, formerly M.G.W.R. No. 42; No. 649, 0-6-0, formerly M.G.W.R. No. 146 *Africa*; No. 660, 2-4-0, formerly M.G.W.R. No. 15 *Rover*. Some G.S. & W.R. engines recently overhauled at Broadstone works are:—4-4-0 No. 12; 2-6-0's Nos. 369 and 370; 0-6-0 No. 260; 0-6-0T No. 209; also D. & S.E. 2-6-0 No. 16 and 2-4-2T No. 435 (formerly D. & S.E. No. 12). G.S.W. 4-4-0 (5 ft. 8 in.) No. 338, rebuilt with Belpaire boiler, new large cab and extended smokebox, is working on the D. & S.E. section as are G.S.W. 0-4-4 tanks Nos. 75, 80 and 279; 4-4-2 tanks Nos. 270 and 274; 0-6-0's 146, 211 and 255; and 4-4-0's 60 and 334. M.G.W.R. 0-6-0 No. 74 *Luna* is still at Bray.—[K. A. MURRAY.]

On March 9 a "special" consisting of six "bogies" (including a dining car) and a guard's van was run from Harcourt Street to Rosslare in connection with the Rugby International at Cardiff. 4-4-0's No. 60 and 338 were engaged, with the former as pilot. No. 338 has now a Belpaire firebox and new pattern cab. No. 436 (2-4-2T) was de-railed south of Dun Laoghaire on March 12, while working to Bray on the 3.45 p.m. from Amiens Street. The line was blocked until midnight. Two ex-D.S.E. 0-6-0's Nos. 440 and 433 have recently been observed in Bray, after a long absence, the latter on the Enniscorthy goods. 0-6-0's Nos. 185 and 255 have been working from Bray shed recently, and another "333" class locomotive—333 itself—has been engaged on the "Mail" for the past couple of weeks, 334 now shunts here. Nos. 160 and 183 (both 0-6-0's) were observed at the North Wall shunting, also No. 356, which was rebuilt in 1925 with new pattern cab and Belpaire firebox, the reversing gear and coupling rods are painted red. 0-6-0 No. 633 was observed at Broadstone having worked in on one of the Cavan trains. Three new 2-6-0's Nos. 384–386 were built at Inchicore in 1927.—[C. J. COGHLAN.]

In addition to many other items of information sent by correspondents named, communications not used, either because they duplicate particulars previously given or for other reasons, have been received from G. A. G. Tippett, F. Stapleton, B. K. Cooper, "Camden," "Merevale," H. N. Woolhouse, "Tintern Abbey," D. Magee, H. Darlington, G. Woodward, D. P. Fisher, J. G. Sturt, R. Webster, "L. Y. R.," D. P. G. F., S. J. Hemington, R. A. Shone, S. P. W. Corbett, "N. S. Owdham," "Royal Highlander," F. V. W., G. A. C., "Expectant," J. H. Biles, R. H. Dale, T. G. Tutin, J. B. Maitland Cowan, A. N. Marlow, K. R. Vasey, "Monk Bar" and others.

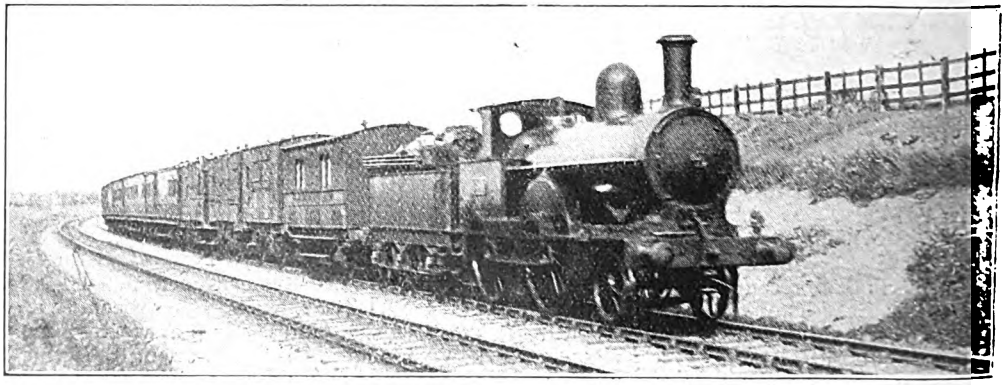
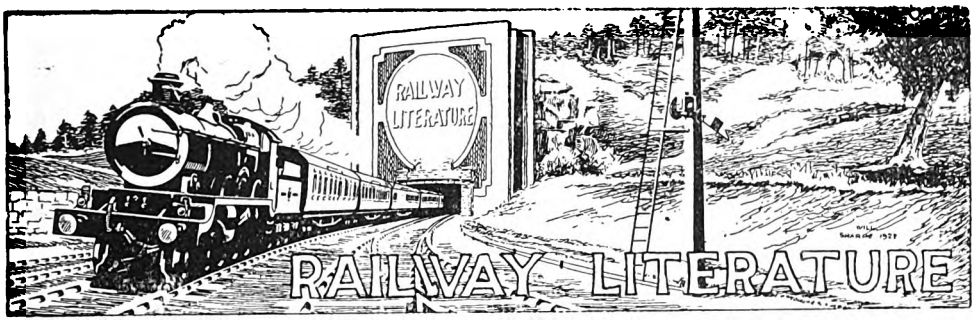


Photo.] [*S. J. Hutchinson.*

L.N.W. "JUMBO" ON A NORTHAMPTON TRAIN NEAR LONGUEVILLE JUNCTION.

(*By courtesy of the "LMS Magazine."*)

Digitized by Google



New Works and Facilities at South Wales Ports and Plymouth.—This brochure, issued by the Great Western Railway Company, gives in brief an admirable account of the increase of facilities provided at the South Wales Docks since they were taken over under the Railways Act of 1921, and also at Plymouth, with special reference to the introduction of the 20-ton wagon, the actual expenditure on which up to the present time is not far short of £500,000. The brochure contains many fine illustrations, and each section is prefaced with a sketch map of the docks dealt with, there being at the end a large folding map of the Great Western Railway Company's system.

"Metro-land."—A new edition of the popular "Metro-land" handbook has been issued by the Metropolitan Railway and may be obtained, price 2d., at any station. It is a particularly interesting and noteworthy production, and extends to 116 pages. It contains, among other features, a selection of beautiful colour plates, an interesting review of the glorious countryside served by the system, and a useful article entitled "How to Get About London." To the house-seeker "Metro-land" will prove a profitable investment, whilst the pleasure-seeker will find in it much valuable information.

Reference may also be made to another booklet issued by the Metropolitan Railway and entitled, "A Day in the Country." It is illustrated in colour and tone, and contains detailed particulars of the glorious countryside easily, quickly and cheaply reached by the Metropolitan Railway, together with information regarding cheap fare facilities, catering arrangements, &c.

G.W.R. Holiday Lands.—The Great Western Railway Company is issuing a booklet dealing with the "unrivalled holiday lands" covered by its system. It contains many interesting illustrations, is clearly printed on good quality paper, and is furnished with an attractive "jacket" in colour. A folding railway map is included.

Ruislip.—Ruislip claims to be the most accessible and least spoiled of the residential districts around London. Moreover, it is served by the Metropolitan Railway with 117 trains daily—25 minutes' run from Baker Street. These interesting facts, and many others about this favoured locality, are embodied in a well-written and charmingly illustrated booklet just issued by the Metropolitan Railway, copies of which can be obtained post free on application to the Commercial Manager, Baker Street Station, N.W.1. An interesting and valuable feature of the booklet is a double-page sketch map showing electric railways serving Ruislip.

Camping Holidays.—A useful booklet has been published by the Great Western Railway with this title, and copies can be had on application. It is neatly produced, with a number of interesting illustrations. There is a foreword on the subject generally, followed by particulars of the special fare facilities offered by the G.W.R. for campers. The bulk of the book is occupied by particulars of suitable sites for camps, owners or tenants of land, and other information. A large folding map of the G.W.R. system is included.

Rivers of East Anglia. By Lieut. Commander John Irving, R.N. Sketches by Beryl Irving. [Published by the London & North Eastern Railway.]

This is a very readable account of the Rivers Crouch, Blackwater, Colne, Stour, Orwell, Deben, Ore (or Alde), the Walton backwaters and Harwich Harbour (or Orwell Haven), and includes a double-page map of the district traversed by the author who, in a breezy introduction, urges the would-be holiday maker, if he would seek romance, to embark in one of the fast L.N.E.R. trains bound for the Land of the Rivers and at the journey's end hire a small boat "and voyage with us through the length and breadth of these East Anglian rivers." The illustrations, which appear on every page, are cleverly done.

Digitized by Google

THE LOCOMOTIVE PUBLISHING CO. LTD. send two sets of railway postcards. No. 15 (in colours) includes two L.M.S., two L.N.E. and two Southern Railway views of the latest trains and engines, while No. 252 (photograph cards) shows six recent L.N.E.R. locomotives. The price of No. 15 is 9d., and 1s. in the case of No. 252.

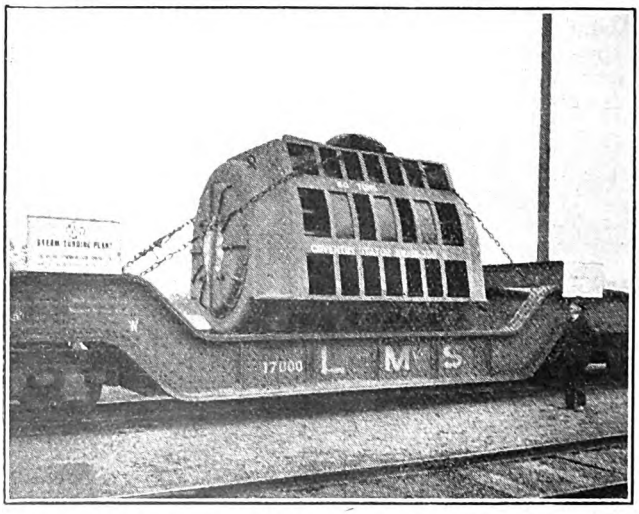
ON THE LINE. By Dell Leigh. Published by Richard Clay & Sons Ltd. (in conjunction with the London & North Eastern Railway Company), the Chaucer Press, Bungay, Suffolk. 199 pp. Price 2s. 6d.

This is a collection of sketches of railway interest written from a somewhat unusual angle. Authority at King's Cross, sceptical but courteous, gave the author (he tells us) a little blue ticket which opens all its doors, and with it he went away to "learn the lore of the Line, and try to tell the tale of it." He has succeeded better, perhaps, than he realises. The sketches number some 50 all told, and most of them do not exceed two and a quarter pages each. They deal with many phases of railway life and work, are graphically written and full of interest. Some, indeed, make quite a powerful appeal —the story of Train Ferry No. 1, for example. Historical facts associated with certain towns or districts—Harwich, for one—are handled with literary skill and freshness, and can be read and re-read with profit and advantage. One of the best things in the book—a word picture in little—is that entitled "A City of Memories," the city in question being Edinburgh. The volume is printed in good clear type on a fine quality paper, and is enriched with a number of illustrations reproduced from drawings by Frank H. Mason, R.B.A., and Freda Lingstrom. The volume is on sale at railway bookstalls and elsewhere, and is, we understand, to be followed by others of a similar character by the same author and by H. V. Morton.

ENGINE DRIVER'S, FIREMAN'S AND GUARD'S MANUAL. By A. E. MacAusland. [Published by the Locomotive Publishing Co. Ltd., 3, Amen Corner, Paternoster Row, London, E.C.4. Price 6d.]

This little booklet will, no doubt, be much appreciated by enginemen and guards, as it includes, in convenient form, the instructions to be observed under various conditions which arise in the working of traffic, with some practical comments.

WHEATSHEAF HOLIDAY GUIDE, 1928.—[Published from 1, Balloon Street, Manchester.] A copy of this guide has been received. It includes brief particulars, in many cases illustrated, of places of holiday resort in all parts of the country, together with particulars of hotels, boarding-houses, apartments, &c. The arrangement is alphabetical.



60-TON STATOR ON 80-TON L.M.S.R. WELL WAGON EN ROUTE TO COVENTRY.

Digitized by Google

The Lovely South of Ireland Calls You

The land that has been immortalised by poets innumerable needs little to emphasise its claims as a holiday area.

The charm of Ireland lies in the South and South-West, where mountain, lake and river combine in presenting to the eye a picture of unparalleled beauty.

The mecca of all tourists to Ireland is Killarney, with its lakes and green isles standing out like jewels against an enchanting woodland background.

Tourist or holiday maker visiting the lovely South, whether mountaineer, angler, antiquarian, or just a lover of the picturesque, will be charmed with the wealth of material for enjoyment and the homely friendship of the inhabitants.

Comfortable and well-equipped hotels with charges that are both absolutely inclusive and extremely moderate.

The Shortest Route to

SOUTHERN IRELAND

is by

GREAT WESTERN RAILWAY

FROM LONDON (Paddington Station)

Via Fishguard and Rosslare. (Sea Passage 2¾ hours.)

Other routes are via Fishguard and Waterford, and via Fishguard and Cork.

Application to

The Superintendent of the Line,
Great Western Railway,
Paddington Station, London, W.2,

will bring you any information you require in regard to holiday travel in Ireland, with a map free of charge.

Digitized by Google

"The Flying Scotsman"

WEEK-DAYS

LONDON (King's Cross)	dep.	a.m. 10 0
EDINBURGH (Waverley)	arr.	p.m. 6 15
DUNDEE (Tay Bridge)	,,	8 5
ARBROATH	,,	8 40
MONTROSE	,,	9 4
ABERDEEN	,,	10 5

ABERDEEN	dep.	a.m. 6 10
MONTROSE	,,	7 10
ARBROATH	,,	7 33
DUNDEE (Tay Bridge)	,,	8 5
EDINBURGH (Waverley)	,,	10 0
LONDON (King's Cross)	arr.	p.m. 6 15

NON-STOP

KING'S CROSS—EDINBURGH

392 MILES

Restaurant Cars
served
from all-electric kitchen

Hairdressing
Ladies' Retiring Room
with Attendant

LONDON & NORTH EASTERN RAILWAY

Digitized by Google

PULLMAN SERVICES

WEEK-DAYS

"The Queen of Scots"

		a.m.
LONDON (King's Cross)	dep.	11 15
		p.m.
LEEDS (Central) - -	arr.	2 40
HARROGATE - -	,,	3 15
DARLINGTON - -	,,	4 7
NEWCASTLE - -	,,	4 57
DREM - - - -	,,	7 8
NORTH BERWICK -	,,	7*a*21
EDINBURGH (Waverley)	,,	7 35
GLASGOW (Queen St.)	,,	8 45

		a.m.
GLASGOW (Queen St.) -	dep.	10 5
EDINBURGH (Waverley)	,,	11 15
NORTH BERWICK -	,,	11*a*25
DREM - - - -	,,	11 41
		p.m.
NEWCASTLE - - -	,,	1 54
DARLINGTON - -	,,	2 42
HARROGATE - - -	,,	3 36
LEEDS (Central) - -	,,	4 10
LONDON (King's Cross)	arr.	7 35

a—Passengers to and from North Berwick change at Drem

"The West Riding Pullman"

		p.m.
LONDON (King's Cross)	dep.	4 45
WAKEFIELD (Westgate)	arr.	7 55
LEEDS (Central) - -	,,	8 16
BRADFORD (Exchange)	,,	8 32
HALIFAX (North Bridge)	,,	8 56
,, (Old) - -	,,	8 59
HARROGATE - -	,,	8 50

		a.m.
HARROGATE - -	dep.	11 0
HALIFAX (Old) - -	,,	10 53
,, (North Bridge)	,,	10 56
BRADFORD (Exchange)	,,	11 20
LEEDS (Central) - -	,,	11 35
WAKEFIELD (Westgate)	,,	11 57
		p.m.
LONDON (King's Cross)	arr.	3 0

SUNDAYS

"The Harrogate Sunday Pullman"

		a.m.
LONDON (King's Cross)	dep.	10 30
		p.m.
LEEDS (Central) - -	arr.	1 55
HARROGATE - -	,,	2 30

		p.m.
HARROGATE - -	dep.	3 15
LEEDS (Central) - -	,,	3 50
LONDON (King's Cross)	arr.	7 15

"The Clacton Sunday Pullman"

		a.m.
LONDON (Liverpool St.)	dep.	9 55
CLACTON-ON-SEA -	arr.	11 32

		p.m.
CLACTON-ON-SEA - -	dep.	5 10
LONDON (Liverpool St.) -	arr.	6 45

Usual Pullman Supplements

LONDON & NORTH EASTERN RAILWAY

Digitized by Google

THE CONTINENT

VIA HARWICH

FLUSHING - - - Daily
THE HOOK - - - Nightly
ANTWERP - - - Nightly, except Sundays
ZEEBRUGGE - - Three times weekly, commencing 22nd June.

VIA GRIMSBY

HAMBURG - Tues., Thurs. and Sats.
ANTWERP - Mons., Weds. and Sats.

All particulars from:
CONTINENTAL TRAFFIC MANAGER, L.N.E.R.
Liverpool Street Station, E.C.2; or Hull; principal L.N.E.R. Stations, Offices and Tourist Agencies.

PREMISES AND SITES

FOR

FACTORIES AND WORKS

ON THE

L·N·E·R

DIRECT RAIL ACCESS MEANS ECONOMICAL WORKING

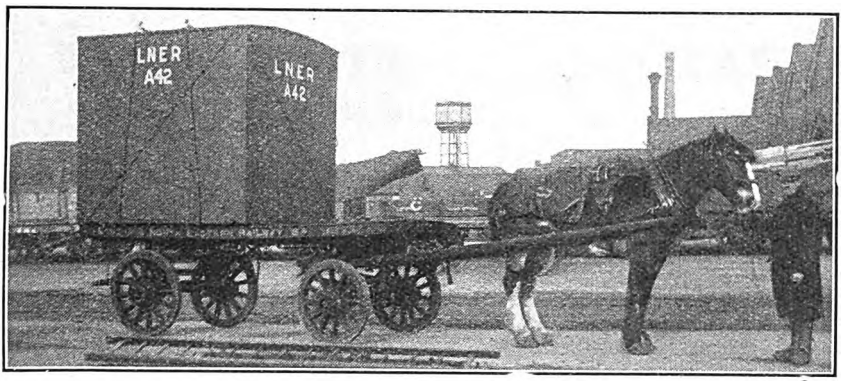
All particulars from:

THE INDUSTRIAL AGENT,
LONDON AND NORTH EASTERN RAILWAY
KING'S CROSS STATION, LONDON, N.1.

LONDON & NORTH EASTERN RAILWAY

Digitized by Google

Use L.N.E.R. Containers



Your Goods carried from Factory to Destination without handling

Road Motor Collection and Delivery Services
between
Farms and Stations
at
Specially Low Rates

Further information will be readily furnished on application to L.N.E.R Goods Depots, or
Goods Manager, Southern Area, Liverpool Street Station, E.C. 2.
Goods Manager, North Eastern Area, York.
Goods Manager, Southern Scottish Area, 50, George Square, Glasgow, C.2.
Traffic Superintendent, L.N.E.R., Aberdeen.

LONDON & NORTH EASTERN RAILWAY

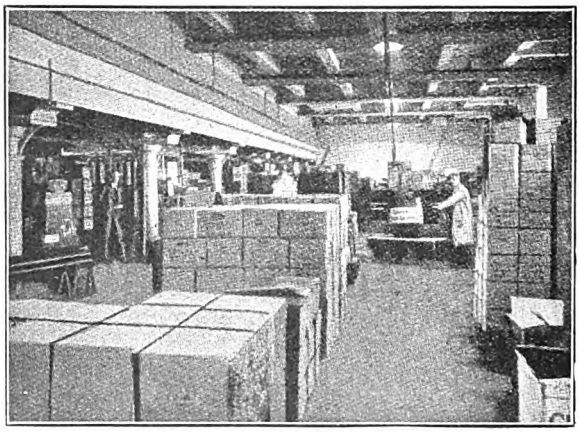
Digitized by Google

AN OUTSTANDING SUCCESS

L M S
RAILHEAD DISTRIBUTION

comprises

(1) Conveyance from factory (or port).
(2) Storage in area of consumption.
(3) Local distribution (by road or rail).



Preserves, &c., for Manchester and District.
Messrs. Chivers & Sons' depot at Manchester, L M S.

THIS service at lower transport cost—ensures prompt execution of customers' orders from stocks held locally.

350 L M S warehouses located at key points directly serve all large consuming areas throughout Great Britain. Self-contained spaces are let on low monthly or quarterly rentals.

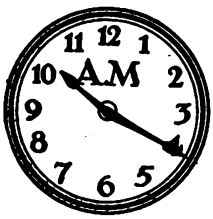
L M S Railhead Depots have solved the distribution problem for many prominent firms whose names are household words.

Attractive illustrated booklet will be supplied on application to:—

Any L M S Agent or District Goods Manager, Goods Manager (Northern Division), St. Enoch's Station Glasgow, or Chief Goods Manager, Euston Station, London, N.W.1 ('Phone: Museum 2900—extension 40).

Digitized by Google

Travel *to* Paris *via* Tilbury-Dunkerque



Depart
LONDON
(*St. Pancras*)

Arrive
PARIS
(*Nord*)

RETURN JOURNEY

PARIS
(*Nord*)
Depart 8.0 p.m.

LONDON
(*St. Pancras*)
Arrive 8.9 a.m.

Third Class Passengers arrive 11.45 a.m. and return from Paris 7.0 p.m.

The Tilbury-Dunkerque route affords the best and most convenient service for business men between London and Paris.

WEEK-END TICKETS

are issued from LONDON TO PARIS at a fare of 77/6, 1st Class and Saloon; 66/2, 3rd Class, Saloon and 2nd Class on Continent; and 40/8 3rd Class throughout.

LMS

IN CONNECTION WITH

THE NEW ROUTE TO THE CONTINENT FOR PASSENGER AND GOODS TRAFFIC

Digitized by Google

GOOLE STEAM SHIPPING

(LONDON MIDLAND & SCOTTISH RAILWAY)

REGULAR SERVICES

BY A FLEET OF TWENTY-TWO NOTED STEAMERS

TO AND FROM

THE CONTINENT

via

GOOLE

(The most inland port on the East Coast)

as follows:—

From GOOLE to		To GOOLE from	
AMSTERDAM	Wednesday & Saturday	AMSTERDAM	Tuesday & Saturday
ANTWERP	Tuesday, Wednesday & Saturday	ANTWERP	Tuesday, Wednesday, Friday & Saturday
COPENHAGEN	Friday	COPENHAGEN	Thursday
DUNKERQUE...	Weekly	DUNKERQUE...	Weekly
GHENT	Wednesday & Saturday	GHENT	Tuesday & Saturday
HAMBURG	Tuesday, Wednesday & Saturday	HAMBURG	Monday, Wednesday & Friday
ROTTERDAM...	Wednesday & Saturday	ROTTERDAM...	Tuesday & Saturday

On the homeward journey the steamers call at HULL to land FRUIT and PERISHABLE Traffic from the Continent.

CONSIGN YOUR TRAFFIC PER GOOLE STEAM SHIPPING L M & S RAILWAY

For rates and other Information apply to the various Agents at:

LONDON ..... A. C. MEREDITH, Goole Steam Shipping, 44, 45 and 46 Leadenhall Street
HULL..... H. HAUXHALL, 9 Pier Street.
MANCHESTER..... H. ROOKE, 79 Corporation Street.
LIVERPOOL..... F. R. HAUXWELL, Bixteth Street
BIRMINGHAM AND WEST MIDLANDS } J. S. BARBER, 7 Burlington Chambers, 118 New Street
YORKSHIRE..... A. E. HILL, Drake Street, Bradford.
MIDLANDS, Nott'm. (East Midlands) .. } D. G. ROBERTSON, Rookwood, Totley Brook, Sheffield.
AMSTERDAM..... SCHEUER BROS., Ltd., Prins Hendrikkade 48
ANTWERP ..... W. H. HARPER, 26 Rue Arenberg
COPENHAGEN..... A. CHRISTENSEN, Shipbroker, Amalie-gade 43
DUNKERQUE .... { GONRAND FRERES, Agents, Quai du Rinkan / J. HUTTER, Shipbroker
GHENT..... V. & L. De BAERDEMAECKER, Rue Fieve 25
HAMBURGH ..... C. WITT & CO., Brandstwiete 7
ROTTERDAM ..... HUDIG & PIETERS, Calandstraat 49
MILAN ..... INNOCENTE MANGILI, Via Pontaccio 13
BASLE ..... CHARLES Im. OBERSTEG & CO. Aeschengraben 30

A. W. BARRETT,
Overseas & Continental Traffic Manager,
27/8 Euston Square, N.W.1

Telephone; Goole Nos. 216, 217, 218
Telegraphic Address; "Despatch, Goole."

E. G. GARSTANG,
Steamship Manager, GOOLE
[East Coast]

Digitized by Google

Digitized by Google

THIS YEAR GLORIOUS HOLIDAYS ABROAD!

LET this year's Holiday be the most wonderful you and your family have ever had!

New experiences await you across the Channel—in Brittany, with its headlands and bays; Normandy with its castles, and Picardy, with the gay *plages*; the Belgian Coast, with Ostend, pearl of continental resorts; Paris, the pleasure city of Europe; Biarritz and St. Jean de Luz, on the door-step of Spain, land of Romance!

Bask in the amazing sunshine of the Summer-time Riviera, and bathe in a sea and beneath a sky the bluest in the world; see Switzerland, gay with mountain flowers, or Germany with her Rhineland Castles and friendly Spas; Austria, with her especial welcome for English visitors; the lazy lovely Italian lakes; the astounding spell of Venice; or the red romantic Dolomites!

This year—glorious, wonderful Holidays Abroad!

Holiday Guide - Books you need :—

"*Normandy and Brittany*" 1/-

"*Golden Sands of Picardy*" 1/-

"*Belgium and the Coast Resorts*" 1/-

"*The Summertime Riviera*" *Free*

and numerous folders and pamphlets giving train and boat services, through fares, etc.

Call or write NOW: *Continental Enquiry Office, Victoria Station, London, S.W.1* or any Tourist Agency of the Southern Railway.

The shortest fastest routes are via

SOUTHERN RAILWAY

From VICTORIA or WATERLOO

Digitized by Google

YOU are interested in Engines ?

Then you should get the new and revised edition of the

"LOCOMOTIVES OF THE SOUTHERN"

Booklet, containing 72 pages of photographs and descriptive matter regarding Southern Railway Engines, including the mighty "Lord Nelson" and the "King Arthur" Type, NOW READY

Price 1/-

obtainable at S.R. Bookstalls and from Locomotive Publishing Company, 3, Amen Corner, E.C. 4.

POST CARDS

"Lord Nelson" and "Atlantic Coast Express."
1d. each.

Express Engines, Goods Engines and Express Trains.
6d. per Set.

A few left!

"King Arthur" Paperweights. **5/- each.**

Also **Coloured Plates 1/- Post Free.**

All obtainable from Advertising Department, Southern Railway, Waterloo Station, S E.1.

Digitized by Google

RAILWAY MAGAZINE

VOLUME 62

January—June, 1928.

Beautifully bound in red cloth gold-lettered covers.

Price 10/-. By post, 10/9.

Red cloth gold-lettered case to bind the six parts of Volume 62

Price 2/-. By post, 2/3.

"RAILWAY MAGAZINE" OFFICES,

33, Tothill Street, London, S.W. 1.

THE WONDER BOOK of ENGINEERING WONDERS

This lavishly illustrated volume aims at presenting by picture and article a fairly comprehensive idea of the world's greatest achievements in engineering.

12 COLOUR PLATES.

256 PAGES. 300 ILLUSTRATIONS.

Price 6/-

By Post 6/9.

Stocked by—

THE RAILWAY PUBLISHING CO., LTD.,

33, Tothill Street, Westminster, London, S.W.1.

LARGE COLOUR PLATES OF LOCOMOTIVE ENGINES.

London Midland and Scottish Railway
Caledonian three-cylinder 4-6-0 locomotive No. 956.

Great Western Railway.
Four-cylinder 4-6-0 locomotive No. 4061.
Glastonbury Abbey.

London Midland and Scottish Railway.
London and North Western four-cylinder 4-6-0 locomotive No. 1407, *L/Corp. J. A. Christie, V.C.*

London and North Eastern Railway.
Great Northern three-cylinder 4-6-2 locomotive No. 1470.
Great Northern.

Magnificent Pictures for framing.

Printed in 11 colours by high-class lithographers.

Size of each plate, 20 by 12 inches.

Full particulars of dimensions given.

Price 1s. each, or 1s. 2d. each by post, unfolded, rolled in tube, ready for framing.

A complete set of four plates is forwarded, post paid, on receipt of 4s. 2d.

Published by the

Railway Magazine

33, Tothill Street, Westminster, LONDON, S.W.1.

Digitized by Google

Now on Sale. Thirty-first Year of Publication.

RAILWAY YEAR BOOK

PRICE 5/- NETT. **1928.** BY POST 5/6

THE WHITAKER OF THE RAILWAY WORLD

Handsomely Bound in Red Cloths

Most Complete Railway Reference Book.
Up to Date and Reliable.

A complete *vade-mecum* for Railway Officers, Railway Shareholders, Contractors, Engineers and Manufacturers of Railway Materials and Supplies.

Latest Railway Statistics and Particulars. Directory of Railway Directors, Chief Departmental and District Officers of British Railways. Railway Telegraphic Addresses and Telephone Numbers. Capital of British Railway Companies. Historical Sketches of Railways in the British Isles. British and Irish Locomotives and Rolling Stock. Railway-owned Steamships, Docks and Harbours. Fastest Non-Stop Runs, Longest Tunnels, Notable Accidents Power Signalling. Largest Railway Stations, &c. Railways in India, British Colonies and Dominions, South America, &c. Electric Railways, Joint Railways, Leased Railways. Railways Act, 1921 : Summary of Sections. Irish Railways Act, 1924. Railway Wages Boards, Railway Councils, &c. Numbers of Railway Servants and Grades. Railway Societies, Associations, Institutions, Trade Unions and Clubs. Railway Bibliography. Statistics of Capital Receipts, Expenditure, Dividends, Rolling Stocks, Railway Engineering Facts and Figures. Railways Officer's "Who's Who," and many other valuable features.

"RAILWAY YEAR BOOK" ORDER FORM.

To
THE RAILWAY PUBLISHING CO., Ltd.,
33, Tothill Street, Westminster, London, S.W.1.

Proprietors of
THE RAILWAY MAGAZINE,
and RAILWAY YEAR BOOK.

Please forward.....*cop*.....*of the* Railway Year Book, 1928.

Remittance.....*s*.....*d. herewith.*

Name.....

Address.....

.....

Date.....*1928.* .....

Digitized by Google

Digitized by Google

THE RAILWAY MAGAZINE.

(With which is incorporated "Transport and Travel Monthly.")

Contents for June, 1928.

		PAGE
FRONTISPIECE (COLOUR)—DIESEL-ELECTRIC TRAIN FOR L.M.S.R.	*Facing*	423
OIL ENGINES FOR RAIL CARS AND LOCOMOTIVES. *Illustrated*		423
MARSEILLES-PARIS "RAPIDE" AT DIJON. *Illustrated*		434
MATTHEW MURRAY AND THE BLENKINSOP LOCOMOTIVES. *Illustrated*	R. E. M. BLEASDALE	435
L.N.E.R. THREE-CYLINDER 4-4-0 LOCOMOTIVE No. 264 "STIRLINGSHIRE." *Illustrated*		440
TWO LITTLE KNOWN CONTINENTAL LOCOMOTIVES. *Illustrated*		441
BY RAILWAY TO THE ROOF OF THE WORLD. *Illustrated*	CHARLES TRAVIS	442
SOUTHERN RAILWAY CARRIAGE FITTED WITH TEMPLATES. *Illustrated*		454
TO BELFAST VIA HEYSHAM, L.M.S.R. *Illustrated*		455
400-MILE NON-STOP RUNS BY "THE ROYAL SCOT" EXPRESS, L.M.S.R. *Illustrated*		461
INAUGURAL LONDON (KING'S CROSS)—EDINBURGH (WAVERLEY) NON-STOP RUNS, L.N.E.R. *Illustrated*		462
"BLUE TRAIN," CALAIS-PARIS-VENTIMIGLIA, PASSING GOLFE JUAN. *Illustrated*		467
BRITISH LOCOMOTIVE PRACTICE AND PERFORMANCE. *Illustrated*	CECIL J. ALLEN	468
THE WHY AND THE WHEREFORE		481
PERTINENT PARAGRAPHS. *Illustrated*		485
WHAT THE RAILWAYS ARE DOING. *Illustrated*		491
LOCOMOTIVE MATTERS		497
RAILWAY LITERATURE		505

Annual Subscription (United Kingdom or Abroad), post free, 13*s.* 6*d.; payable in advance. Single copies or back numbers (if in print), by post* 1*s.* 2*d.*

Registered at the General Post Office for transmission by Magazine Post to Canada and Newfoundland.

All articles and illustrations submitted must be accompanied by a stamped and addressed envelope, for return in case of non-acceptance.

(*ALL RIGHTS RESERVED.*)

Editorial, Advertisement and Publishing Offices: 33, TOTHILL STREET, WESTMINSTER, LONDON, S.W.1.
TELEPHONE: VICTORIA 8886 (8 lines).

CENTRAL ARGENTINE RAILWAY.

Buenos Aires. Rosario. Sante Fé.
Córdoba. Santiago. Tucumán.

Serves the districts in which the principal industries of the country are to be found, and runs through the heart of the grain zone to the sub-tropical province of Tucumán, the sugar producing centre.

Through route to BOLIVIA, PERU and the NORTH.

LUXURIOUS DINING, SLEEPING, AND SALOON CARS.

In addition to high-class catering in the trains and station refreshment rooms, the Company controls the

SIERRAS HOTEL at ALTA GRACIA,

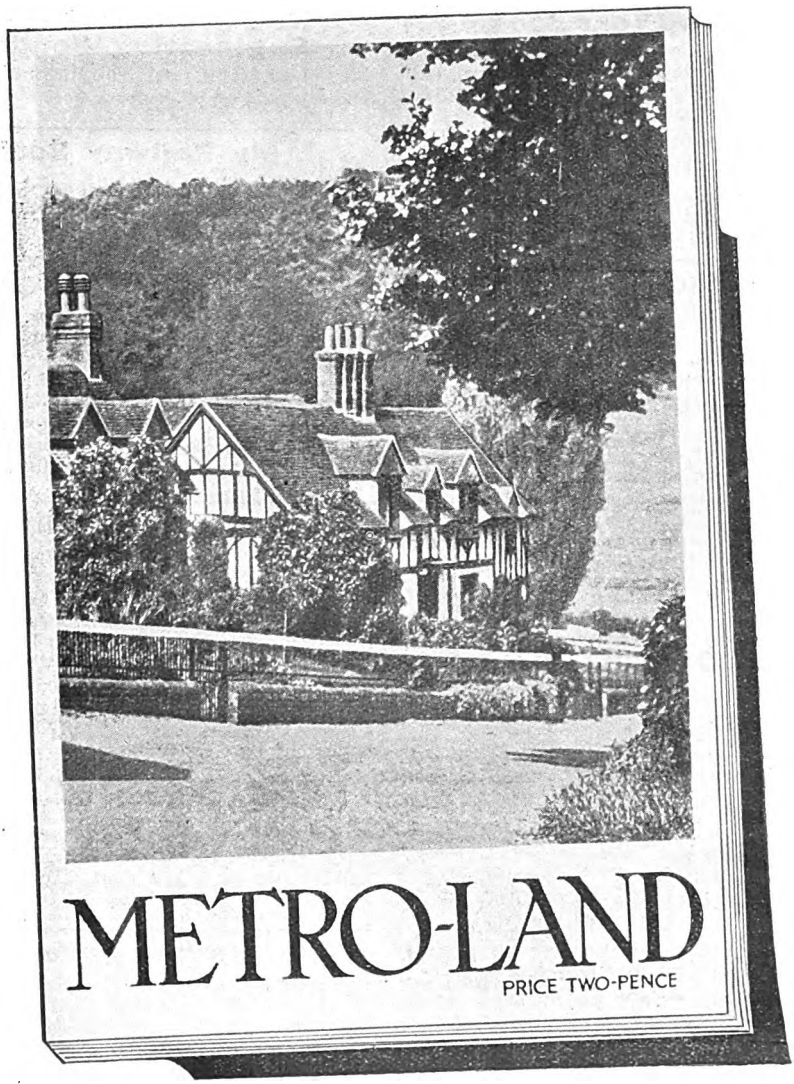
a renowned Health and Pleasure Resort in the beautiful Province of Córdoba.

Enquiries
3a, Coleman St., London, E.C.
299 B.Mitre, Buenos Aires.

RONALD LESLIE,
General Manager.

Digitized by Google

Digitized by Google



116 PAGES OF PICTURE & STORY

Contains a comprehensive description of the charming countryside served by the Metro., together with a store of literary, historical and biographical information, full-page colour plates, guide to London, folder map, etc. etc.

Price 2d. at any Metro. Booking Office or Bookstall, or direct from Commercial Manager, Baker Street Station, N.W.1.

AKER ST. STATION, N.W.1. R. H. SELBIE, GENERAL MANAGER.

Digitized by Google

RAILWAY AND LOCOMOTIVE BOOKS, ETC.

Railway Year Book.

STANDARD Railway Reference Work. Published annually since 1898. The Edition for 1928 is now on sale. Price 5s. By post, 5s. 6d. Abroad, 5s. 8d.

Vacuum Brake.

ALL details fully illustrated and described, including coloured Chart of the complete system. Price 2s. 6d. By post, 2s. 8d.

Westinghouse Air Brake.

AN illustrated description of the System and its working. Splendid diagrams in colour, etc. Price 2s. 6d. By post, 2s. 8d.

Lectures on the Locomotive.

BY Dugald Drummond, M.I.C.E. With Supplementary Lectures by R. W. Urie, M.I.Mech.E. Sixth Edition. Profusely illustrated. Sold for the benefit of the London and South Western Railway Orphanage. Price 3s. 6d. By post, 3s. 9d.

G.W.R. Engine Book.

EDITION for 1926. Names, numbers, types and classes. Illustrated. Price 1s. By post, 1s. 1d.

L.B. & S.C.R. Engine Book.

WITH addenda giving alterations to December, 1925. By W. G. Tilling. Profusely illustrated. Price 2s. 6d. By post, 2s. 8d.

L. & N.W.R. Engine Book.

A REGISTER of all the locomotives in use on the L. & N.W.R., December 31, 1921. Includes table of classes, engine shed numbers, etc. By C. Williams. Price 3s. 6d. net. By post, 3s. 8d.

SUPPLEMENT to the Register showing corrections to June 30, 1924. Price 1s. By post, 1s. 2d.

The Iron Road.

BY Cecil J. Allen. 16 full page coloured plates and 250 photographic illustrations. Price 6s. By post, 6s. 9d.

History of the Great Western Railway.

BY E. T. MacDermot, M.A. Profusely illustrated. Vol. I (1833-1863), in two parts. Price £1 1s.

Notes on Railway Signalling.

BY J. Parsons and B. W. Cooke. 74 pages. Just the book for the student of Signalling. Price 3s. 6d. By post, 3s. 9d.

The Wonder Book of Engineering Wonders.

12 Colour plates, and 300 Illustrations. Price 6s. By post, 6s. 9d.

My Railway Book.

BY Cecil J. Allen. 16 full-page coloured plates and 240 photographic illustrations. Price 5s. By post, 5s. 9d.

Large Colour Plates.

FOUR fine lithographic plates of locomotive Engines printed in Eleven colours. Magnificent pictures for framing. Size of each plate 20 by 12 in. Subjects:—Caledonian 4-6-0, No. 956; L. & N.W. 4-cylinder 4-6-0, No. 1407; G.N. 3-cylinder 4-6-2, No. 1470; and G.W. 4-6-0, No. 4061. Price 1s. each. By post, rolled and enclosed in a tube, 1s. 2d. each, or complete set, post free, 4s. 2d.

Small Colour Plates.

METROPOLITAN Railway 4-4-4 Engine, No. 103; L.M.S.R. Down "Royal Scot" Express, Portsmouth Restaurant Car Express Train, Southern Railway. L.N.E.R. Coat of Arms. G.W.R. Cornish Riviera Express. L.N.E.R. Down Midday Scotch Express. Down West of England Express, G.W.R. Pullman Continental Express passing Knockholt, Southern Railway. L.N.E.R. Up East Coast Express leaving Aberdeen. Price 3d. each. By post, 4d.

Bound Volumes.

RAILWAY MAGAZINE. Half-Yearly Vols. 46, 51, 52, 53, '54, 55, 59, 60, 61 and 62. In gold-lettered red cloth, 10s. each. By post, 10s. 9d. All others are out of print.

Binding Covers.

RED cloth, gold-lettered binding cases for RAILWAY MAGAZINE, each to bind six parts, Vols. 1 to 62 inclusive. Price 2s. each. Postage for one case, 3d. If more than one is ordered at the same time, add 1d. postage for each cover after the first.

Binding.

HALF-YEARLY Volumes of the RAILWAY MAGAZINE are bound on following terms. Send the Parts securely packed in Carriage Paid parcels, and they will be returned strongly bound, in red-cloth, gold-lettered cases, post free in the British Isles, 4s. 9d. for one; 8s. 9d. for two; 13s. for three, or 17s. 3d. for four volumes. Remittance with order.

THE RAILWAY PUBLISHING CO., LTD.

33, Tothill Street, Westminster, London, S.W.1.

Telephone: VICTORIA 8836

Digitized by Google

6th EDITION now ready.

LOCOMOTIVE MANAGEMENT
from Cleaning to Driving,

by JAS. T. HODGSON, M.I.Mech.E.

(Chief Engineer and Superintendent of Works, The Municipal College of Technology, Manchester; President, Railway Locomotivemen's Craft Guild, Manchester and District)

and JOHN WILLIAMS

(late Locomotive Inspector, Great Central Railway),
(Lecturer to Locomotive Classes for the Manchester Education Committee).

25,000 Copies already Sold.
New and Revised Edition of 7,000 Copies Now Ready.

A HANDY REFERENCE BOOK for DRIVERS and FIREMEN, and all who are concerned in the Management, Upkeep, and RUNNING OF LOCOMOTIVE ENGINES.

FULL EXAMINATIONS for LOCOMOTIVE ENGINE DRIVERS and FIREMEN, including PRACTICAL QUESTIONS and ANSWERS on RULES, THE BOILER, ENGINE, BRAKES, BREAKDOWNS with TEMPORARY REPAIRS and so on, WHILE OUT ON THE ROAD.

OVER 280 ILLUSTRATIONS and 449 PAGES, INCLUDING PHOTOGRAPHS OF MODERN ENGINES and FOOT-PLATE ARRANGEMENTS, on the RAILWAYS OF THE UNITED KINGDOM and IRELAND.

While the art or skill of a craftsman is never to be wholly acquired by reading, the quality or success of craftsmanship may be greatly enhanced by a knowledge of the theoretical laws upon which a craft is based. As denoted by its title this book is primarily intended to be of service to the man on the footplate, and to the candidate for such a position.

Commencing with the "cleaner," the writers have endeavoured to set forth in an easy and essentially practical manner the various duties connected with the running of a locomotive engine, which, together with the progressive description of the operation and uses of the various parts of the boiler, engine, tender, brakes, etc., should be of assistance to the rising young driver or fireman, in the acquisition of such information relative to his work, as may not be otherwise obtainable. It is hoped that the systematic manner in which the chapters on firing, feed-water, heat and steam, boiler construction and detail, engine materials and methods of construction, valve setting and valve events, compound engines, superheaters, brakes, engine failures and breakdowns, etc., have been arranged, combined with the practical hints as to daily routine work, will not only be of assistance when preparing for such examination as the railway companies require, but will also be found of service in the everyday work of the locomotive driver or fireman.
In addition to mechanical knowledge as to routine work and engine failures, etc., the examination usually includes a test of the candidate's familiarity with such Clearing House or Railway Company's rules as may be applicable to his daily duties.

This knowledge of the rules may therefore be taken as a necessary part of a driver or fireman's equipment, hence the chapter on and examination questions for same.

THE NEW EDITION.

For this edition the book has been thoroughly revised and brought up to date. The chapters on Superheated Steam and Lubrication have been rewritten and the important developments in Locomotive engineering which have taken place during the last few years have received attention. Illustrations and descriptions of the Caprotti valve gear and the Lentz patent poppet valves and gear are included, also illustrations and references to high pressure locomotive boilers and water-tube fire-boxes, and turbo-condensing locomotives. The illustrations of typical locomotives, reproduced from official photographs, include all the most recent types of passenger and goods engines placed in service on the railways of this country. The principal dimensions are set out underneath the illustrations in each case, while in the Appendix typical footplate views of these engines, with the parts numbered and key lists provided for reference, are given.

REVISED SIXTH EDITION : Price 5/- net.

Post free United Kingdom and Abroad, 5/6.

Publishers:

The RAILWAY ENGINEER, 33, Tothill Street, Westminster, London, S.W.1

Digitized by Google

MISCELLANEOUS ADVERTISEMENTS.

Latest date for receiving advertisements:—9th of the month for the following month's issue. Price twopence per word, minimum, 3s. 6d. Remittance with order. Postage charged on "Box" orders.

A REVELATION in Railway Photography —our burnished sepia cards and enlargements. Brighton list covers interesting engines of past 55 years; trains, stations, etc. Southern General, all sections. French. Extended Lists gratis. O. J. MORRIS, 304, Beulah Hill, London, S.E.19.

FOR SALE. RAILWAY MAGAZINE. Unbound, February, 1920—June, 1928. "Locomotive News." May, 1921—September, 1923. Best Offer. — F. MITCHELL, 127, Newbold Road, Chesterfield.

GREAT War Railway Snapshots (France), including British Locos., also Battlefield scenes. Treasures for collectors. Detailed list for stamp.—R. S. MCNAUGHT, 194, Upper Brook Street, Manchester.

LOCOMOTIVE Postcards, past and present types, British Rlys. 3/- doz. Send 6d. P.O. for two specimens and List.—R. JONES, 97, Cromwell Road, Winchester.

FOR SALE. Railway Working Timetables, Notices, etc., in good condition.—Send stamped addressed envelope for list to BM/DCCH, London, W.C.1.

RAILWAY MAGAZINE, for Sale, cheap. Railway and Travel Magazines, Locomotive and Railway Books. List free.—R. AXTON, Pacefield, Marple, Cheshire.

WANTED, complete set of RAILWAY MAGAZINE bound volumes, since inception; in good condition, quote price. Write, BOX 19, c/o THE RAILWAY MAGAZINE, 33, Tothill Street, London, S.W.1.

EARLY Railway Books and Pamphlets.—COTTERELL & Co., Booksellers, 17, Dale End, Birmingham.

POSTCARD PHOTOGRAPHS OF EXPRESS TRAINS AND LOCOMOTIVES. Send 4d. for Catalogue and Specimen. (Post only.) L. GOOD, 30, Meadowhill Road, King's Norton.

RAILWAY PHOTOGRAPHS.

Real photo-postcards. Just issued: L.N.E.R. "Yorkshire"; new L.M.S. Tanks; "Queen of Scots" drawn by "Royal Scot" type; "Flying Scotsman" new type tender; 3d. each, 12 different 2/2 post free. By arrangement with Mr. F. E. Mackay we are able to supply all his latest photographs of trains. Send for list No. 2 R.—RAILWAY PHOTOGRAPHS—13, North John Street, Liverpool.

TELEPHONE VICTORIA 6800

for the Private Hire Department of the London General Omnibus Company and let them quote you for the transport of your party by Motor Coach.

"General" Coaches will go anywhere and at any time. They will bring you back home at whatever hour may suit you.

"General" Coaches are of an "All Weather" design. They ensure perfect safety and a maximum of comfort. The drivers are selected for their skill and caution.

You will be sure of a thoroughly enjoyable outing if you hire a "General" Coach.

T3/49/28

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

Digitized by Google

UNIVERSITY OF ILLINOIS-URBANA
3 0112 111148331

Digitized by Google